NOVEMBER 1957

RAILWAY TRACK and STRUCTURES

A Simmons-Boardman TIME-SAVER Publication

Protect the **heart** of every mile of track...

—install

IMPROVED HIPOWERS

THE SUPER POWERED SPRING LOCK WASHERS

—with reserve power that holds rails and joints TIGHTER, LONGER!

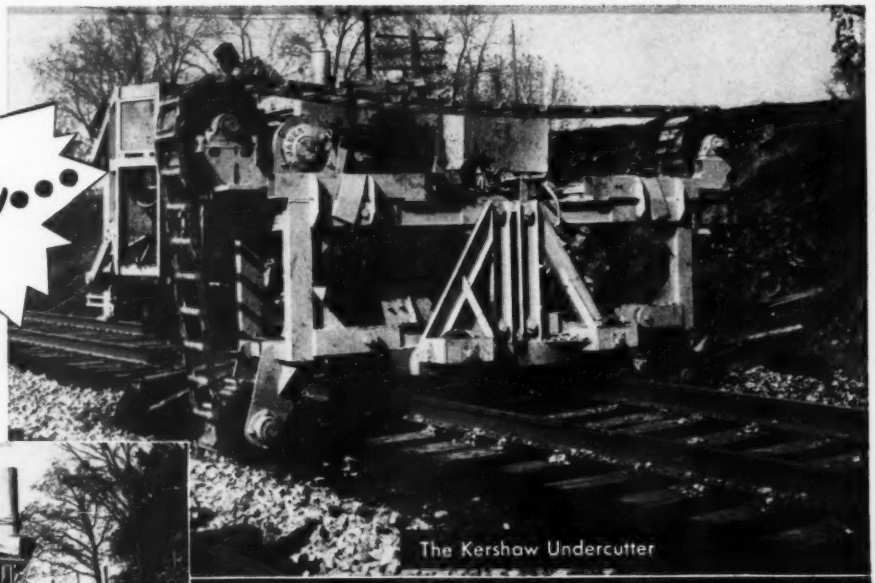
Improved Hipowers maintain constant bolt tension, keep bolts tight, absorb shocks, protect rail ends. These super-powered railway spring washers withstand the terrific stresses and strains, and the constant pounding of main line traffic. Reduce maintenance costs by installing National Spring Washers.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

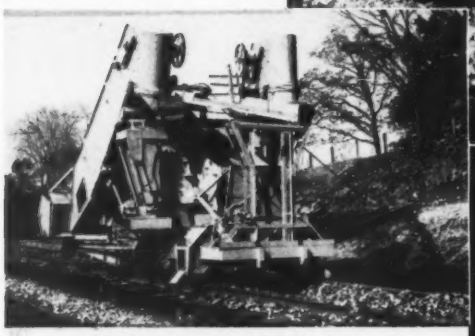
The NATIONAL LOCK WASHER COMPANY

Specialized Industry Since 1900 NEWARK 5, NEW JERSEY, U.S.A.

Proven...



The Kershaw Undercutter



The Kershaw Ballast Cleaner

The Kershaw 2-Wheel Kribber

The Kershaw Jack-All

Recondition WITHOUT RAISING TRACK... Recondition WITHOUT NEW BALLAST!

Kershaw Jack-All first raises track, catching off ties. The Kershaw Two-Wheel Kribber, each with two digging wheels, then scarifies and removes the ballast from the tie cribs four inches below the bottom of the tie between the rails, and on the outside of the rails.

The Kershaw Undercutter and Skeletonizer follows by undercutting the track three to four inches. A continuous chain extends under the track, removes the ballast and piles it in rows on the shoulder.

Next comes the Kershaw Ballast Cleaner which picks up the old ballast, cleans it, disposes of dirt on shoulder, and puts the cleaned ballast back in the track.

Track is now ready for raising to original elevation and for final tamping on cleaned ballast. Track is reconditioned without new ballast and with same top of rail elevation.

KERSHAW
MANUFACTURING CO. INC.
MONTGOMERY ALABAMA

Why your special trackwork problems belong right here

A double crossover, built up from girder rail, reposes on our layout floors at Steelton, Pa., waiting for the final OK from our trackwork engineers before being dismantled and shipped to its final destination.

This gigantic trackwork gem is as close to perfection as any you'll ever see. It was painstakingly preassembled, checked, and rechecked before a single joint bar was approved for shipment to the customer. In our shops even the most routine trackwork order gets this same close attention to detail.

Why not call in a Bethlehem engineer to help you with your special trackwork problems? We know that when the track materials arrive at your site, they will fit perfectly. We also know that they will save you money through elimination of field-cutting, curving, and drilling of rails.

Our trackwork engineers are ready to go to work on your trackwork specialties. Just phone or write the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem Products are sold by Bethlehem Pacific Coast Steel Corporation; Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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1931 26 CONSECUTIVE YEARS 1957
MODERN BALLAST CONDITIONING

BEFORE *"R.B.C.C." Service*

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"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 26 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

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"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.

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MINNEAPOLIS, MINN.

METROPOLITAN BANK BLDG.
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TRACK and STRUCTURES

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Pipe templates solve bridge rebuilding problem 21

Fast water and a rock bottom made rebuilding of a demolished span a thorny problem which was solved by a novel method.

More punch for pile hammers 25

The first of a two-part series on pile driving, this article discusses the more recent advances in hammers, with emphasis on the diesels.

Tie car speeds unloading, cuts costs 28

How the Western Pacific, by using specially designed cars, is shaving more than 8½ cents per tie from its tie-distribution costs.

Laying RR story on the line 30

That's what Railway Age did in its recent "Outrage" issue—a Special Report to Congress.

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DON'T MISS . . .

When you install turnouts in connection with your new-rail program, do you experience delays because some parts are not on hand at the time of installation? The Santa Fe avoids this by shipping two complete turnouts per car under a "package" system.

. . . in the December issue

new plus features

of the new MATISA TIE RENEWAL MACHI

STILL THE FAMOUS DUAL PURPOSE PRINCIPLE... one machine does the work of two . . . old ties out, new ties in— **in half the time, half the cost!**

new Improved tie rollers . . . reduce maintenance, improve effectiveness.

new Now self-propelled by bigger and better hydraulic motor. Variable speeds for operating and traveling.

new Large hydraulic-oil reservoir equipped with breath cap, filter and oil-level indicator.

new Electric warning horn.

new Increased hydraulic pump speed and capacity.

new Engine equipped with electric self starter and mo neto ignition.

Lease and optional purchase plans available

MATISA EQUIPMENT CORPORATION

1000 Washington Avenue • Chicago Heights, Illinois

RAILWAY
TRACK and STRUCTURES

News notes...

. . . a resumè of current events throughout the railroad world

The 13 Regional Shippers Advisory Boards predict a decrease of 2.1 per cent in the number of cars loaded with revenue freight in the fourth quarter of 1957 as compared with the same period last year. Carloadings of the 32 principal commodities would thus be approximately 200,000 cars under the 1956 fourth quarter total, according to the estimates.

•

"Cold analysis" of the facts should rule out negative thinking about the railroads' future, declared President P. M. Shoemaker of the Lackawanna in a recent speech. Addressing the New York Society of Security Analysts, he said he had the feeling "that some financial writers have not been unhappy about emphasizing railroad problems, emphasizing railroad competition and in general presenting a discouraging picture.

•

The railroad employment outlook, as viewed by the Department of Labor, is that "thousands of new workers will be hired during the next few years." At the same time, total railroad employment will decline. The new job opportunities are expected to result in large part from deaths and retirements, because railroaders are among the oldest workers in American industry.

•

Failure of a trestle across Albemarle Sound was the cause of a freight-train derailment on the Norfolk Southern on July 5, 1957, in which two railroad employees were killed, according to the Interstate Commerce Commission, which said the piling of the trestle had "deteriorated to a dangerous degree." The Commission recommended that the railway immediately arrange for a thorough and systematic inspection of the trestle by competent engineers, that weaknesses be corrected, and that the carrier immediately initiate an adequate maintenance program.

•

Class 1 railroads in August had estimated net income, after interest and rentals, of $81 million—down $7 million from the $88 million reported for August 1956. For this year's first eight months the estimated net income was off $60 million—$474 million compared with $534 million last year.

•

ICC Commissioner Tuggle, in a recent address, spoke of the importance to the railroad industry of further exploitation of electronics and "push-button" methods for the faster and more economical movement of heavier trains. Said Mr. Tuggle: "I can assure you that the Commission will not impede . . . the industry in beating this problem." Pointing to the advances that have been made in signaling techniques over the years, Mr. Tuggle stated "the rail industry has not fallen behind in this highly competitive high-speed era."

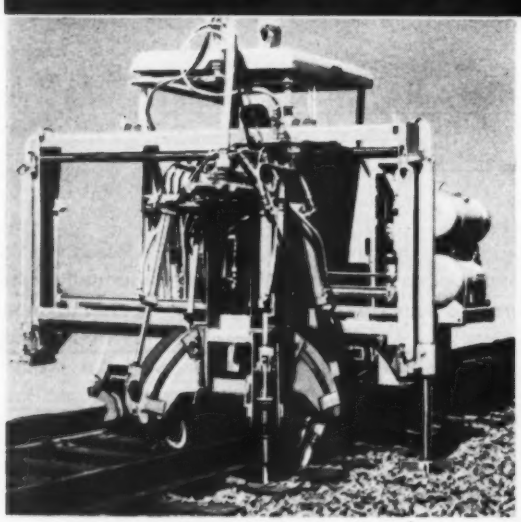
•

The Frisco formally opened its recently completed $10 million Tennessee yard near Memphis on October 24. The new yard, the first hump-retarded yard constructed by the road, was actually placed in service in June. It replaces Yale yard which is being converted to industrial sites.

IN TRACK MAINTENANCE . . .

These Jobs* are Done Best *by* RMC MACHINES

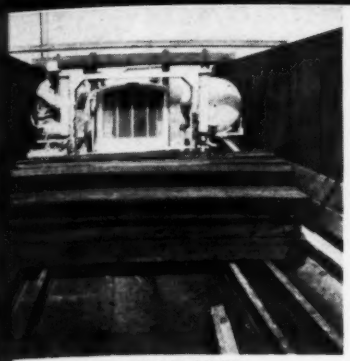
* TIE TAMPING



McWILLIAMS SPOT TAMPER
Provides big-tamper ballast compaction for smoothing, spot surfacing and yard and terminal maintenance.

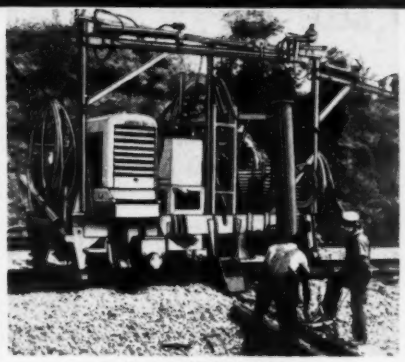
McWILLIAMS PRODUCTION TAMPER
Will finish tamp any raise up to 6" at speeds up to 720' per hour.

* TIE UNLOADING * TIE REPLACING * TIE SPACING



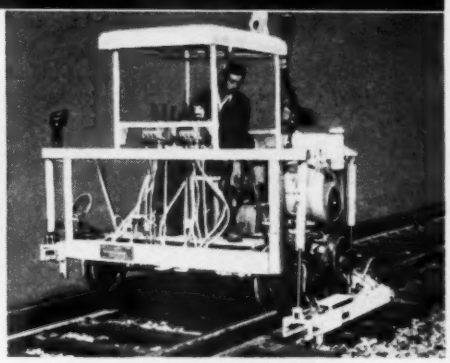
R.M.C. TIE UNLOADER

oads ties from modified cars, cing them on the berm in cor- t position for tie renewal.



R.M.C. TIEMASTER

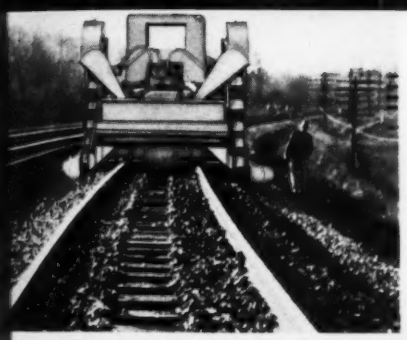
Replaces ties at a rate of approximately one per minute with three men, with minimum track disturbance.



R.M.C. TIE SPACER

Corrects poor tie spacing and slewed tie conditions by means of two hydraulic shifting devices.

* DISTRIBUTING BALLAST * CLEANING BALLAST

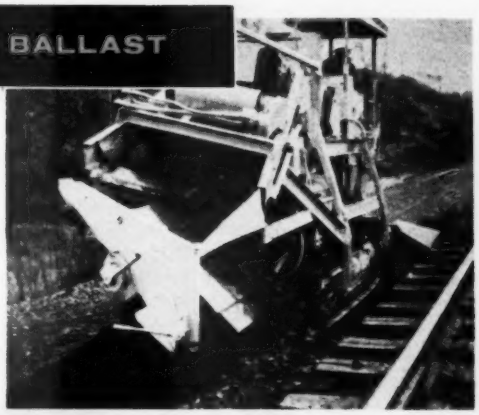


McWILLIAMS BALLAST DISTRIBUTOR

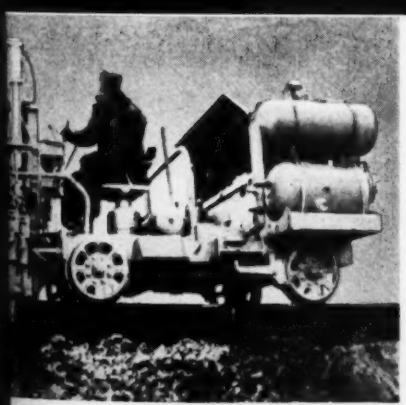
Places ballast in desired quantity in exactly the proper position for tamping, shaping shoulder and inner-track space.

McWILLIAMS SUPER MOLE

Cleans or excavates shoulder ballast at speeds up to 2400' per hour.



* DRIVING SPIKES * LINING TRACK



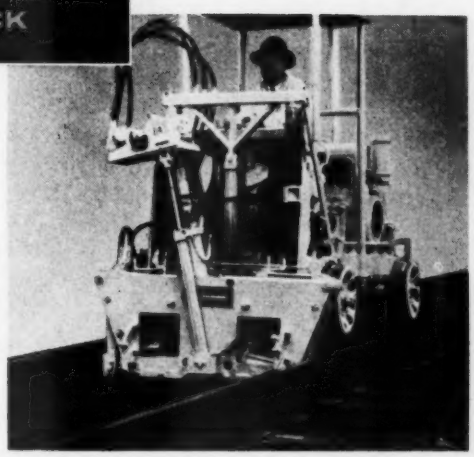
R.M.C. SPIKEMASTER

Nips up the tie and drives four spikes, one on each side of both rails. Speed: better than six ties per minute.

R.M.C. LINEMASTER

Lines over 6000 feet of track per day, using an operator and one man sighting. Wheel-mounted and crawler mounted models.

Trial and LEASE Plans



Railway Maintenance Corporation

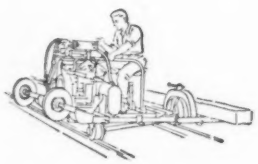
PITTSBURGH 30, PA.

One man can do the work of fifteen with . . .

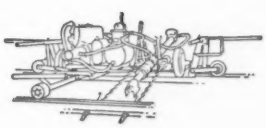
Fairmont

THE FAIRMONT W87 SERIES B TIE BED SCARIFIER (illustrated on the opposite page) provides a sure way to reduce tie renewal costs. The W87 can dig a tie bed ten feet long to a predetermined depth in a minute or less . . . *up to 800 hard, dry tie beds a day!* What's more, ties go in straight and properly spaced. How many men would you need with picks to equal that rate and quality of production? Plenty . . . and it's the reason why cost records everywhere show the W87 paying for itself—and even earning dividends—in just a few months. Modernize and mechanize *your* tie gangs with the Fairmont W87 Series B Tie Bed Scarifier!

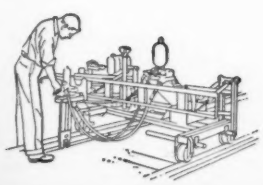
Other Tie Renewal Equipment by Fairmont



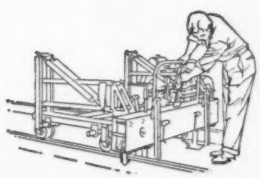
W90 SERIES A TIE HANDLER inserts or removes ties quickly and requires only two men for operation. Simple design and sound construction. Self-propelled. Two-way operation.



W68 SERIES A HYDRAULIC TIE REMOVER removes ties at an average rate of approximately one per minute. Ruggedly built with a minimum of moving parts. Requires only two-man operation.



W84 SERIES B HYDRAULIC SPIKE PULLER is primarily for use in tie gangs. Light in weight, it features a ball-and-socket-mounted pull assembly. Will pull from either rail without change-over.



W86 SERIES A HYDRAULIC RAIL LIFTER features a spring-counterbalanced lifting arm, welded steel supporting frame and a direct-driven hydraulic pump. Two-man track removal.

W83 SERIES B TIE NIPPER (not illustrated) features a simple linkage and lever which guarantee positive opening and closing of hooks. The handle can be placed in three different positions.

FAIRMONT
RAILWAY MOTORS, INCORPORATED
FAIRMONT, MINNESOTA

MANUFACTURERS OF BALLAST MAINTENANCE CARS, DERRICK CARS, OIL SPRAY CARS, GROUTING OUTFITS, TIE RENEWAL EQUIPMENT, RAIL RENEWAL EQUIPMENT, WEED CONTROL EQUIPMENT, HY-RAIL CARS, TRACK MOTOR CARS, PUSH CARS AND TRAILERS.

Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

WORK EQUIPMENT. A new 40-page, two-color catalog has recently been released by the manufacturer covering its complete line of maintenance-of-way equipment, track motor cars, and other accessories. The booklet contains illustrations of each machine and presents full specifications and operating details. (Write: *Fairmont Railway Motors, Dept. RTS, Fairmont. Minn.*)

CONSTRUCTION EQUIPMENT. A new 8-page booklet, designated CG-15, is available describing and illustrating products manufactured for construction use by the manufacturer. The catalog includes photographs and specifications of the manufacturer's complete line of portable air compressors, both reciprocating and rotary; of the Tractair, a combination, compressor-tractor, and attachments; of Newmatic air tools, including breakers, drills, tampers and spades; and of CRD one-use drill bits. Twenty-two photographs, many of construction scenes, are used to illustrate the products. (Write: *Sales Promotion Dept., LeRoi Division, Dept. RTS, Westinghouse Air Brake Company, Milwaukee, Wis:*)

CRANES. Three Gould reports, designated reports Nos. 5601, 5609, and 5610, have recently been released describing the manufacturer's hydraulic crane. Case histories are presented wherein the crane was employed to advantage by the Western Gravel Company, the Pullman-Standard Car Manufacturing Company and the I-T-E Circuit Breaker Company. (Write: *Austin-Western Works, Dept. RTS, Baldwin-Lima-Hamilton, Aurora, Ill.*)

WELDING BLOWPIPES. A new 8-page booklet is available describing the new W-47 welding blowpipe. Complete information and performance data on welding heads and cutting nozzles is included in the new folder which also describes cutting attachments that quickly convert the new blowpipe from welding and heating to flame-cutting on all metal thicknesses up to 8 in. (Write: *Linde Company, Division of Union Carbide Corporation, Dept. RTS, 30 E. 42nd Street, New York 17.*)

COUPLINGS. A new 12-page bulletin describing Para-Flex flexible cushion shaft couplings, has recently been introduced. The bulletin, designated A-669, explains how the coupling, by means of a rubber tire element, accommodates angular misalignment, parallel misalignment and end float, singly or in any combination, in addition to cushioning shock loads and diminishing torsional vibration. Several pages are devoted to tables with engineering data to facilitate selection of couplings for a multitude of applications. (Write: *Dodge Manufacturing Corporation, Dept. RTS, Mishawaka, Ind.*)

MACHINE PERFORMANCE. Good machine performance is usually traced to proper operator care, according to a new bulletin, entitled "Maintenance Guide" which has been prepared by the manufacturer. The 24-page booklet has more than 75 full-color drawings of helpful hints for obtaining optimum service life from the D7, D8 and D9 tractors. Methods of preventing abnormal track wear are discussed in detail and instructions for maintenance of seals, proper track adjustments and lubrication are illustrated. Copies of the Maintenance Guide, designated Form No. 32395, are available in English, French, German, Spanish & Portuguese. (Write: *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*)

News about people

ATLANTIC & EAST CAROLINA—William C. Radford, division engineer on the Southern at Columbia, S. C., has been named general manager of the A&EC at New Bern, N. C.

CANADIAN NATIONAL—A. E. Monaghan, operation trainee, has been appointed division engineer at Capreol, Ont., succeeding **J. D. Walker,** transferred. **J. E. G. Auger,** acting roadmaster on the Beattyville-Chibougamau branch line at Miquelon, Que., has been named assistant roadmaster. **J. A. Touchette,** acting roadmaster on the Beattyville-Chibougamau branch line, has been named assistant roadmaster at Parent, Ont., succeeding **J. A. Belanger,** who has been named roadmaster at Chibougamau.

J. A. Peebles, training supervisor, Maintenance of Way programs, Western region, has been promoted to assistant to chief engineer—personnel and training, at Montreal, succeeding **J. F. Davison,** who has been named assistant to chief engineer—capital budget procedures. **G. S. Forbes,** has been appointed assistant to manager of work equipment at Montreal.

CENTRAL OF GEORGIA—Simon Fogarty, Jr., acting division engineer at Savannah, Ga., has been named division engineer, succeeding **R. H. Gilkey,** who has retired.

CHARLESTON & WESTERN CAROLINA—T. C. Herndon, roadmaster at Augusta, Ga., has been promoted to engineer maintenance of way at Augusta.

DENVER & RIO GRANDE WESTERN—A. G. Harden, assistant supervisor of structures, has been promoted to supervisor of structures on the Pueblo division, succeeding **E. T. Richie,** who has retired.

FRISCO—T. J. Pigg has been appointed assistant roadmaster at Ft. Smith, Ark. and **L. A. Thomas** has been named assistant roadmaster at Ft. Worth, Tex. **R. I. Taylor,** assistant roadmaster at Amory, Mo., has been transferred to Chaffee, Mo., succeeding **O. W. Hawkins** who has been promoted to roadmaster at Chaffee. **D. S. McCully,** has been named assistant roadmaster at Oklahoma City, Okla., succeeding **G. P. Chandler,** who has been promoted to roadmaster at Enid, Okla., succeeding **G. C. Payne,** who has been named general foreman B&B and water service at Ft. Smith, Ark. Mr. Payne succeeds **C. E. Wallace,** who has been named general foreman B&B and water service at Springfield, Mo., succeeding **Frank Jones,** who has retired after 46 years of service. **D. L. Walker,** has been named standards engineer at Springfield.

PENNSYLVANIA — Albert J. Syvertson, track supervisor at Terre Haute, Ind., has been transferred to Subdivision No. 1 at New York, succeeding **L. D. Freeman,** who has been named assistant district engineer of the Pittsburgh region at Pittsburgh, Pa.

TEXAS & PACIFIC—W. J. Savage, assistant chief engineer, has been promoted to chief engineer at Dallas, Tex., succeeding **R. J. Gammie,** who has retired after 47 years of service. **J. L. Weatherby,** signal engineer, has been named assistant chief engineer, succeeding Mr. Savage. **R. C. Caldwell,** superintendent of work equipment, has been appointed to the newly created position of engineer of track at Dallas.

UNION PACIFIC—J. M. Bates, division engineer at Kansas City, Mo., has been promoted to assistant to the chief engineer at Omaha, Neb. **E. M. Chalk,** industrial engineer at Kansas City, has been promoted to division engineer, succeeding Mr. Bates.

Biographical briefs

James L. Way, 61, who recently retired as division engineer of the Chicago, Burlington & Quincy at Lincoln, Neb. (*RT&S,* Sept., p. 26), attended the University of Nebraska and Columbia University and joined the Burlington in 1920 as a draftsman in the architect's office at Lincoln. He was named assistant engineer in Lincoln in 1936 and in 1954 was promoted to division engineer—the position he held at the time of his retirement.

L. H. Schaeparklaus, 65, who recently retired as district engineer structures, on the New York Central at Indianapolis (*RT&S,* Sept., p. 26), attended the University of Cincinnati and the S. P. Chace College of Law and joined the CCC&StL in 1916 as a draftsman. After serving with the U. S. Army in World War I he returned to the CCC&StL in 1919 as a dsigner at Cincinnati and in 1926 was named assistant engineer in charge of design of the L&J bridge at Louisville, Ky. In 1929 he was named assistant engineer in charge of design of the Dayton Union track elevation at Dayton, Ohio, and, in 1929, was named squad boss—bridge design. In 1953 he was named assistant district engineer of structures and in 1955 was promoted to district engineer of structures at Indianapolis, Ind.—the position he held at the time of his retirement.

Wilson D. Slater, 38, who was recently named assistant division engineer on the Erie (*RT&S,* Sept., p. 26), graduated from the Case Institute of Technology and joined the Erie in 1942. After serving with the U. S. Army Transportation Corps, he was named rodman at Hornell, N. Y., in 1946. He subsequently served as levelman at Youngstown, Ohio, transitman at Youngstown, chief of engineering corps at Youngstown, general foreman at Forest Hills, N. J., and head of the engineering corps at Jersey City. In 1955 he was named general foreman at Jersey City, which position he held at the time of his recent promotion.

A. C. Trimble, 29, who was recently named supervisor of track on the Chesapeake & Ohio at Presque Isle, Ohio (*RT&S,* Sept., p. 26), joined the C&O in 1945, working in the division engineer's office at Ashland, Ky., during summer vacations. In September 1948, he was named rodman at Russell, Ky., and served at Ashland in that same capacity until April 1953 when he was named assistant cost engineer at Louisa. He served as assistant cost engineer at Grand Rapids, Mich., from April 1956 until he was named assistant supervisor of track at Welbridge, Ohio, the position he held at the time of his recent promotion.

Herbert L. Chancey, 45, who was recently promoted to roadmaster on the Seaboard Air Line at Dillon, S. C. (*RT&S,* Sept., p. 26) joined the Seaboard in October 1942 as an apprentice foreman. He served subsequently as section foreman, rail gang foreman and assistant roadmaster prior to receiving his recent promotion.

Stanley A. Swartz, 31, who was recently named assistant division engineer on the New York Central at Chicago (*RT&S,* Sept., p. 26), attended the Missouri

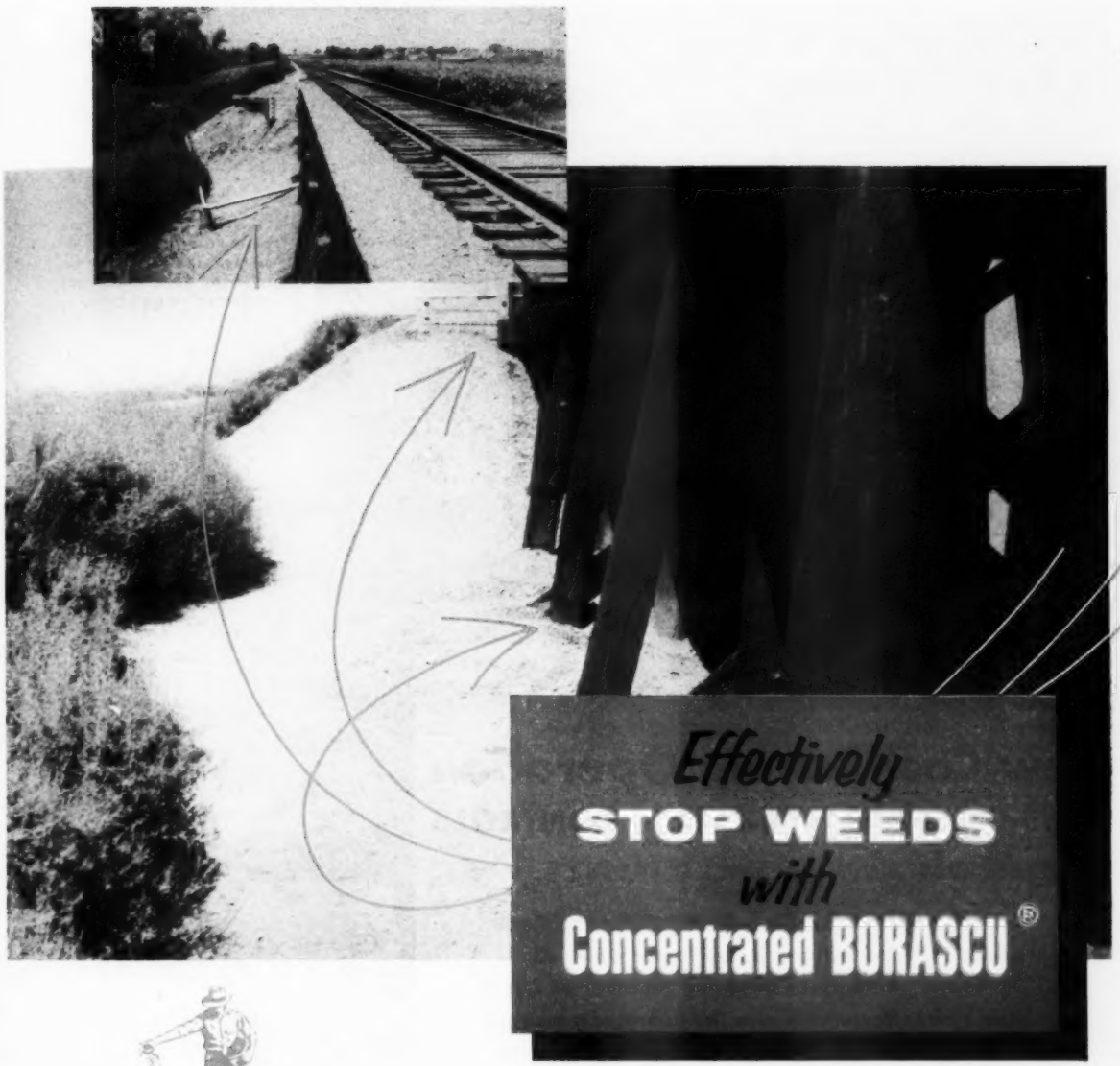
(*Continued on page* 62)

W. J. Savage
T&P

J. L. Weatherby
T&P

James L. Way
CB&Q

L. H. Schaeparklaus
NYC



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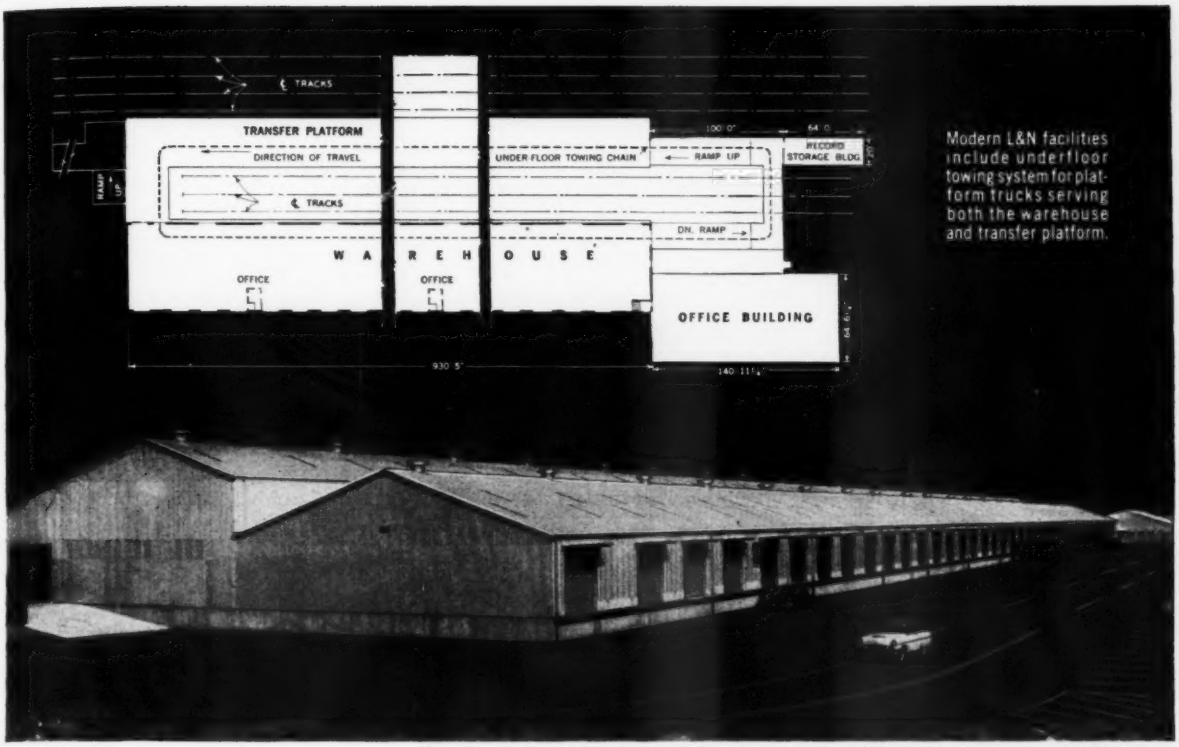

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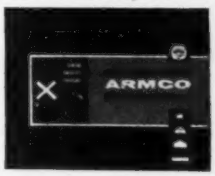


ARMCO STEEL BUILDINGS

Dear reader:

RAILWAY
TRACK and STRUCTURES

Tough talk about a tough problem

Look in any direction you wish on your railroad and you will find evidence of great technologic progress. And no one can say that the M/W departments have lagged behind others in the contributions they are making.

But these questions still remain: Is everything being done that can be done to promote efficiency and reduce costs? Bringing the matter right down to our own doorstep, are individual supervisors taking full advantage of the available opportunities for introducing cost-saving practices?

Judging by remarks he made before the Roadmasters' and B&B conventions in September, D. W. Brosnan, vice-president-operations of the Southern, would say "no!" to these questions. In fact, he was pretty emphatic about it. "In our industry there is a great deal of lethargy at all levels," he declared. "Far too many railroad officers, from presidents down and supervisors up, are content with the status quo. This attitude seems to say: 'Let's preserve things as they are; any change looks like work and will likely interfere with a complacent mind and way of life. If change is to come it can come after we are gone; we should finish our days in comfort.' "

Mr. Brosnan thinks this attitude is "one great curse of our industry." If the railroads are to offer better service at lower costs there will be "no room for lethargy, for contentment, for 'can't do' attitudes, or for passing the buck." He insisted that "those who stand still are left behind in any procession," and that "to keep up, and especially to walk at the front, is a challenge worthy of the best" in M/W officers.

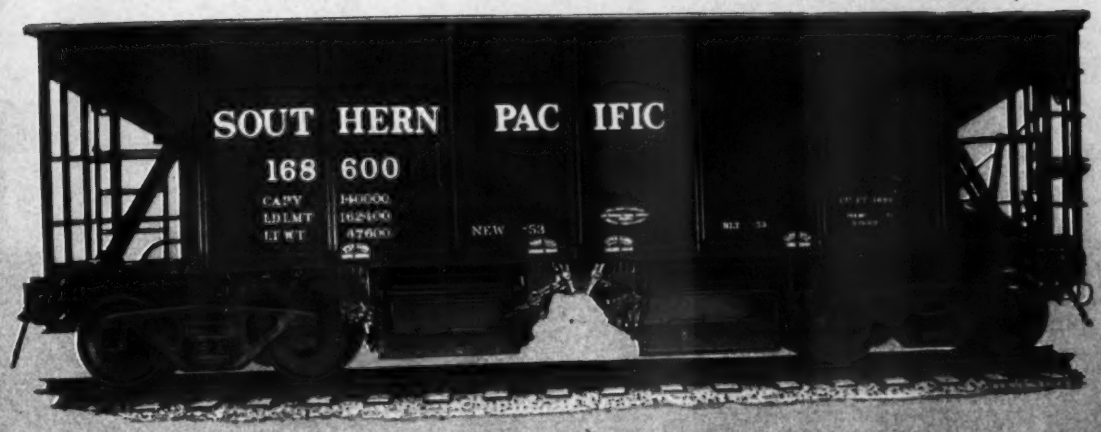
He believes that what is being done (in the way of reducing costs) "is not nearly adequate," and that "energy, thought, courage and self-dedication are essential to success." Maintenance of way men, he adds, "can afford to do no less."

There are two basic problems facing the railroads, one external, the other internal. The external problem is the one that has been created by competition from other forms of transportation, and it has been aggravated by archaic regulation of the railroads on the one hand and subsidies handed to their competitors on the other.

M/W people individually can't do too much about this external problem. It is a battle that must necessarily be fought on the governmental level where the weapons are methods of persuasion brought to bear on our elected representatives. In this battle our companion publication, Railway Age, has taken a leading role by publishing a special report to Congress (pages 30 and 31), which dramatizes the figurative chains that are keeping the railroads from assuming their rightful place in the transportation picture.

But the internal problem is another matter. This is the problem that arises from the need to render better service and to reduce costs. M/W supervisors, as we mentioned earlier, are doing a great deal about the problem of cost reduction. Mr. Brosnan would have them do much more. Certain it is that the need has by no means been fully satisfied.

MHD



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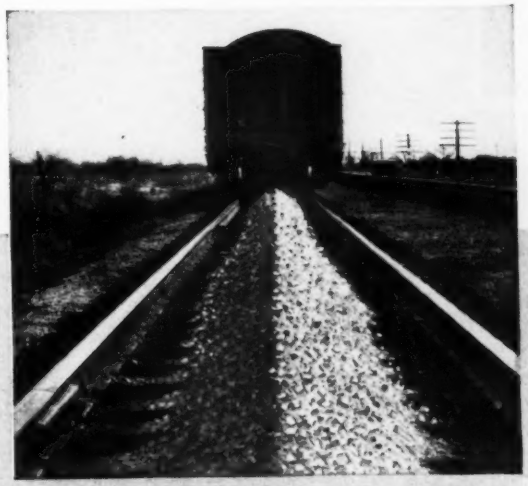

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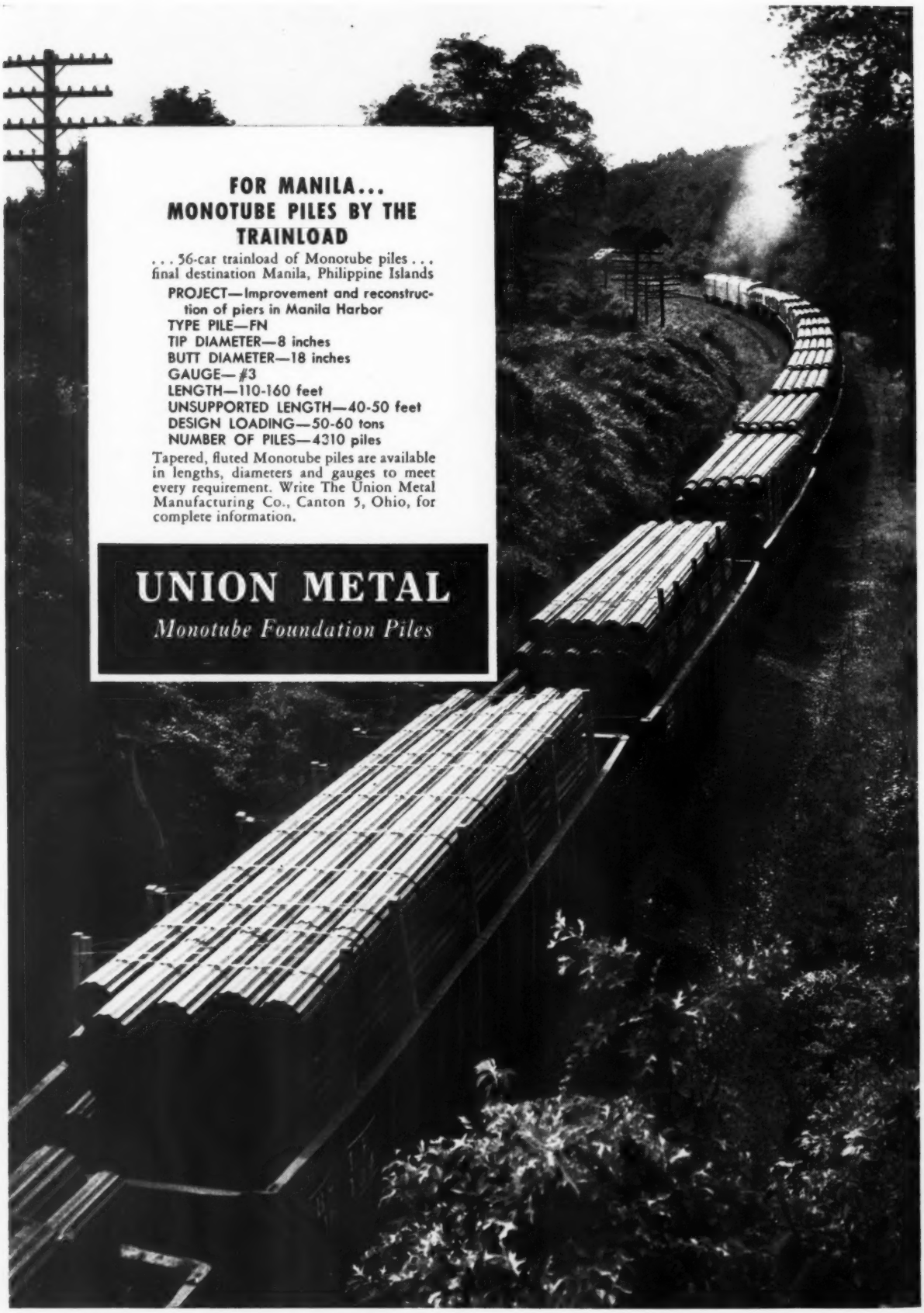
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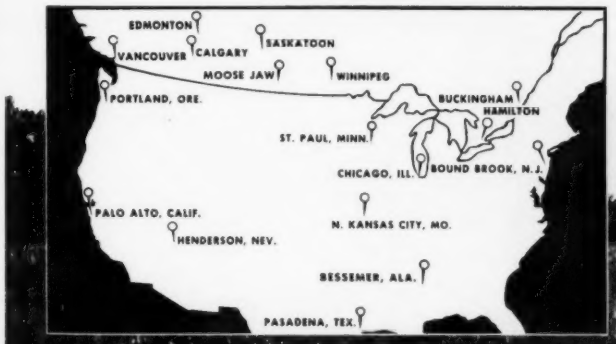

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Exceedingly efficient and widely used by small gangs in low lift and smoothing work, cross-overs and spots the on-track machines can not reach.

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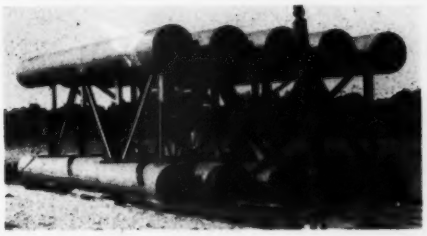
RAILWAY TRACK and STRUCTURES

Pipe Templates...



... Solve this tough bridge-rebuilding job

Swift, deep water flowing over rock bottom was the situation facing Santa Fe engineers when a derailment caused collapse of a 200-ft truss span across the Washita river.

What they did was to fabricate templates of 30-in pipes, sink them to rock, drill holes into rock through the pipes, and insert H-piles. Result: Girder bridge ready for service in 25 days.

• Saturated after 30 days of rain, the embankment had given away under a Santa Fe freight train near Dougherty, Okla., derailing it. Some of the derailed cars had plunged down the embankment and others, still drawn by the locomotive, had crashed into and collapsed a 200-ft single-track Pratt truss span over the Washita river, dropping it and about 20 cars into the swollen stream.

Timber trestle not possible

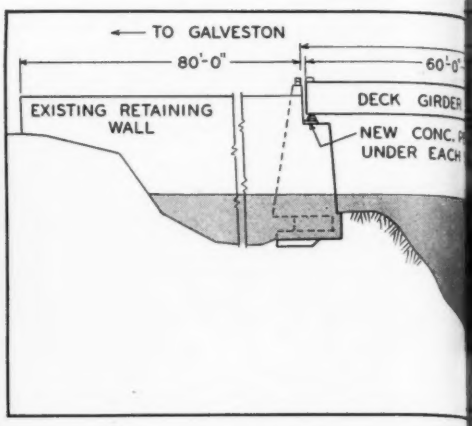
Even while the wrecker was on its way to pick up the cars, the engineering department was mobilizing its forces to rebridge the river. It was evident immediately that the job wasn't going to be easy. The driving of a timber trestle was out of the question because the streambed was scoured down to rock by the fast, deep water. Perhaps, it was reasoned, H-section steel piles could be driven into the rock. But a test pile failed before sufficient penetration could be obtained.

The railroad knew, then, that ex-

Reconstruction step by step

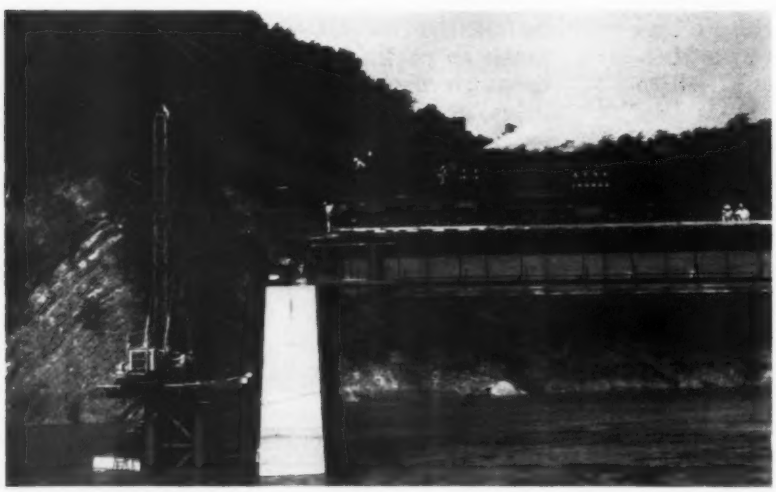
Pipe templates (continued) . . .

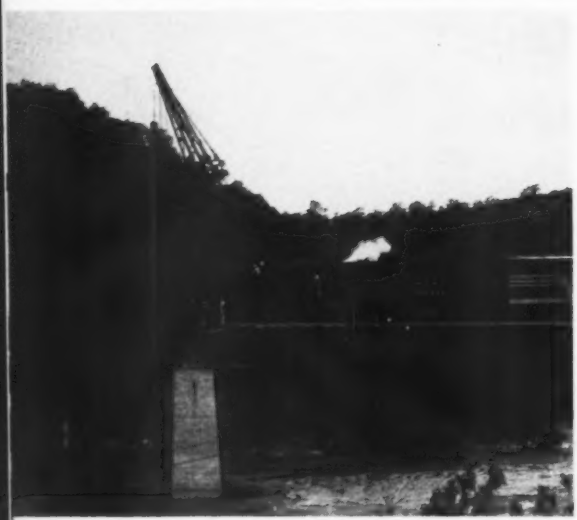
Here are details of the three H-pile piers with pipe templates



This is the method that was followed in constructing the piers

ERECTION DERRICK lowers pipe template for new pier No. 3. Guide lines to far shore were used to assist in its accurate placement in the fast water.





DRILL RIG is set on a platform built atop the template. Holes were bored 6 ft into the rock through the pipes.

H-SECTION steel piles were inserted through the pipes into the drilled holes, driven down, and grouted in place.

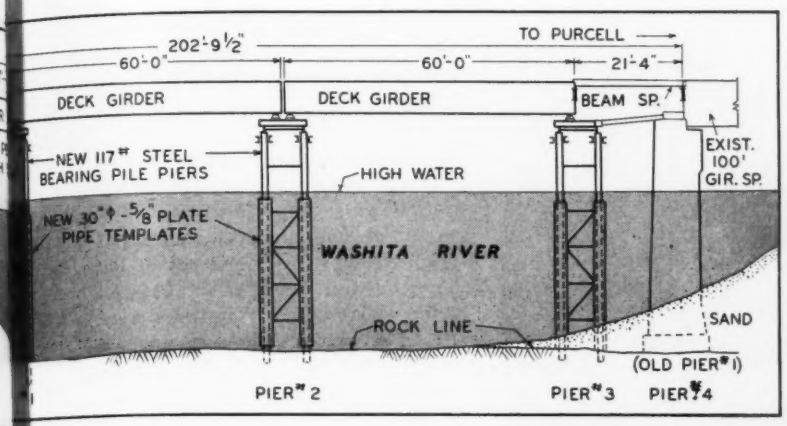
traordinary measures would be needed. Its intention was to bridge the gap with a structure consisting of three 60-ft deck-girder spans and a 22-ft beam span. The real problem was how to construct three new piers to support these spans. The river was swift, loaded with drift and, be cause of recurrent storms in the watershed, its depth was varying between 10 and 33 ft. To help solve the problem the Sante Fe engaged the firm of Brown & Root, Houston, Tex., as consultants as these engineers have had considerable experience with marine projects.

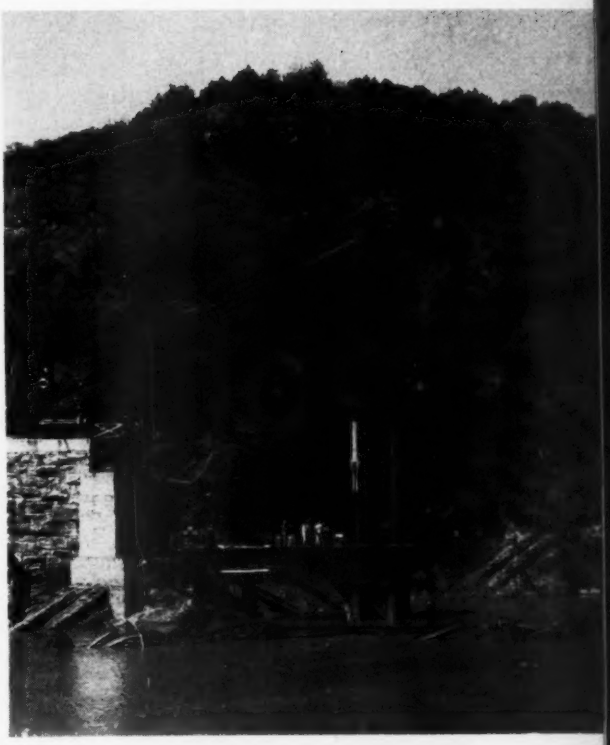
Decide on pipe templates

The recommendation of the consultants was to construct the three new piers of 14-in 117-lb steel H-piles inserted and grouted in holes drilled 6 ft into the rock, each pier to consist of 10 piles arranged in two bents of five piles each. To enable the rock drilling to be carried out with accuracy in the fast water, it was decided to prefabricate a heavy template for each pier, which would be positioned and lowered in place and held firmly by cables while the pile holes were bored with a rotary drill rig set on a platform built on top of the template.

How templates are made

Each template was constructed of 10 steel pipes 30 ft long and with outside diameters of 30-in. Prior to shipment to the site the pipes were fabricated into bents each consisting of five pipes welded together by pipe spacers 13 in. in diameter. At the site the six bents were arranged in pairs to form the three pier templates





ERECTION of three 60-ft.girders and a 21-ft beam span rebridged the Washita river following destruction of truss.

PIER NO. 1 is now being driven. Cage was suspended below pile hammer to hold it vertical while driving.

needed. In each pier template the bents were spaced 8 ft apart. All fabrication was by welding.

When the first pier template had been completed, it was loaded on a flat car and pushed behind a steel-erection derrick to the north side of the former truss opening. The erection derrick, capable of lifting 40 tons at a 53-ft radius, then picked up the 33-ton pipe template and swung it in place for new pier No. 3 (see drawing). It was held in position by four cables, fastened to its upper and lower ends and running to pieces of rail anchored into the rock on the upstream side of the river. Engineers using transits directed the positioning of the template.

To hold the pier template firmly in its upright position, four 14-in 117-lb H-section anchor piles were driven 8 in into the rock by a McKiernan-Terry 10 B3 hammer suspended from a jib and operated by compressed air furnished by one of the road's new pile-driver outfits. A metal cage was attached below the hammer to hold it vertical while it was driving.

How holes were drilled

With the template anchored in position a wood platform was built on top of it and a rock-drilling rig, having a 20-in diameter rotary drill, was set on the platform. This rig, working through the pipes, drilled holes 6 ft deep into the rock at each of the 10 pile locations.

Because of the uneveness of the rock surface a diver was used to determine how each pipe of the template was setting with respect to the rock. Based on his measurements inserts of 27-in O.D. pipe were cut and

FIRST 60-FT girder span was set at the east end after piles had been cut off and capped and the bridge seats constructed. Beam span has already been erected.

Pipe templates (continued) . . .

COMMUNICATIONS with the opposite shore were maintained with a Motorola walkie-talkie set. A boat was used for transporting men and materials.

DIVER was employed to determine places where template did not engage the uneven rock surface. Inserts were then dropped inside template to close gaps.

dropped down the pipes of the template to close the gap between the lower ends of the pipes and the rock surface.

Grout in pipe templates

Following this, H-section piles were driven into the drilled holes and grouted in place. The pipes of the template were then filled with crushed stone and grouted. The piles were cut to proper elevation, after which they were capped and cross braced and a bridge seat was constructed of H-section members. This work was done by welding and was followed by the setting of the bridge shoes.

The next step was the construction of pier No. 1. For this operation the equipment had to operate from the south bank. To reach that position it was necessary to move the equipment over a detour route 350 miles long.

The procedure used in constructing pier No. 1 was essentially the same as for new pier No. 3 except that a guide frame, bearing against the south abutment, was used to assist in placing the template. Also, because pier No. 1 is 60 ft from the south abutment, it was beyond the reach of the derrick boom. For this reason a 75-ton locomotive crane, working on the opposite side of the stream, was employed to out-haul the steel-pipe template while it was being set in place.

Change in procedure

Another change in procedure was to mount the four steel anchor piles on the template before it was placed. This was done by temporarily bolting the H-piles to small brackets welded to the template pipes. When the pier template had been properly positioned, the bolts were burned off, allowing the anchor piles to drop to the rock where they were driven about 8 in into the rock. While pier No. 1 was being constructed, the beam span between new pier No. 3 and old pier No. 1 was constructed.

New pier No. 2 was built in much the same manner as the others. The new 60-ft girder spans were swung into place and a creosoted ballasted deck was constructed. The track was then laid across the bridge and the first train was run over it just 25 days after the bridge was demolished.

WHAT'S NEW IN PILE DRIVING? — PART 1

Gravity, steam, air and, now, diesel . . .

More punch for pile hammers

DIESEL HAMMER, this one a Delmag from the Foundation Equipment Corp., gets a workout on the Canadian Pacific.

An up-to-date account of what has been done in recent years in the improvement and further development of the pile hammer—especially insofar as diesel power is concerned—this article is the first of a two-part series. The second part, to appear in next month's RT&S, will discuss the advancements which have been made in pile-driving accessories such as leads, cranes, power plants, earth drills, etc.

● From that time — ages ago — when some enterprising Neanderthal intellectual started the practice of pile driving by pounding a stake into the ground with the aid of a heavy stone, much progress has been made in the art.

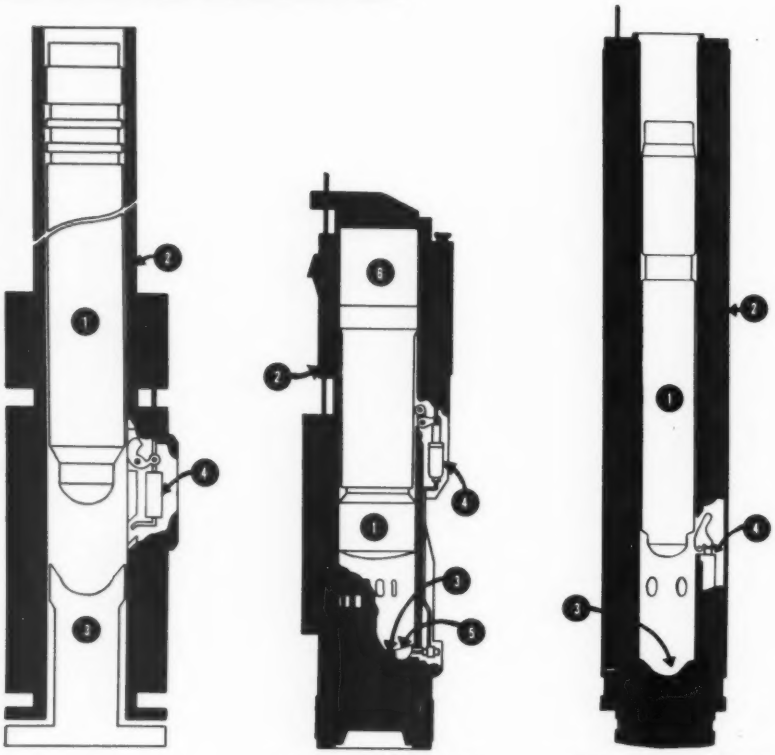
The early Greeks and Romans improved the practice by coming up with a winch-derrick arrangement whereby the weight—or hammer—was mechanically raised to fall upon the head of the pile. This was the first real pile-driving apparatus. As time passed, a few more improvements were made—notably the introduction of leads to guide both the hammer and the pile—but, for centuries, the basic principle of the drop hammer remained. Whenever better pile penetration was called for, hammer weights were increased.

About the time that hammers were getting too heavy for horse-powered winches to raise, the steam engine was introduced and pile-driving activity took a noticeable upswing. The first—and most logical—application of steam power to pile driving was in powering the winches. The winch would raise the heavy drop hammer to a tripping point in the leads from whence it was dropped upon the pile cap.

It was not long, however, before a faster, more efficient method of driving was called for. It was then that the new tool of steam power was adapted to furnish a portion of the impact. Single, and then double-acting piston hammers were developed in a wide variety of weights, blow frequencies and styles. Steam to power these hammers came, invariably, from the same plants which operated the winch and the crane which supported the leads. In the course of development, it was found, too, that the independently-operated steam hammer could be inverted, when desired, to serve as a pile extractor.

It was not long, however, before the advent of the internal combustion engine began to make itself felt in the pile-driving field. First came the gasoline engine, followed in course by the diesel. Cranes and winches which had, heretofore, been powered and propelled by steam plants, were switching over to the more economical, flexible and portable power plants. Gone was the convenient source of steam for powering the hammers. Compressed air then came into the picture to power the steam hammers—usually with little or no hammer modification required. Thus there was eliminated the need for water and boiler fuel supply. Finally, in just the past several years, there has come about a radically new idea in pile-driving hammers: the completely self-contained diesel-powered hammer.

Before discussing this new and apparently promising development in pile hammers, it must be noted that each successive development in pile hammers has not necessarily obsoleted previous methods. As an ex-



	Link-Belt Speeder Models 105	312
Ram piston weight (lb)	1,460	3,800
Blows per minute	90-98	100-105
Striking energy ft lb/blow	7,500	18,000
Fuel consumption gal/hr	0.9	2.5
Fuel tank capacity (gal)	4	9
Total weight (lbs)	3,600	10,000

DIESEL HAMMER FEATURES. The ram (1), acts as a piston within the cylinder (2) and descends to strike the anvil (3). Fuel in all three hammers is pumped by a cam-actuated device (4). In the Delmag and McKiernan-Terry hammers, the fuel is deposited directly on the face of the anvil. In the Link-Belt Speeder hammer it is injected at high pressure into the combustion chamber (5) while stroke frequency is practically doubled by action of "bounce" chamber at top of cylinder (6).

ample, there is at least one major Class I railroad in the country today that is firm in its belief that the elementary drop hammer, free-falling and unpowered insofar as impact is concerned, is still the most efficient and economical means for driving the great majority of piling.

Steam hammers, powered by flash-type steam generators or other types of portable boiler units, are still extremely popular. New and improved types of air, steam—yes, and even drop—hammers have been introduced by manufacturers in recent years that reach hitherto unattained peaks of driving efficiency. Technological advancements, notably in metallurgy and precision manufacturing techniques, have made these new hammers possible.

So why, one might ask, all the ballyhoo about diesel hammers? In spite of all the advances made in contemporary type hammers, the desire is yet strong among bridge and construction men for a completely self-contained and self-powered pile hammer. On the railroads, especially, such a device could conceivably find especially wide acceptance inasmuch as attendant steam boilers, compressors, water pumps, hose lines, etc., could be dispensed with. All eyes are on the development of the diesel hammer since it promises high efficiency at a correspondingly lower overall cost.

The diesel pile hammer incorporates the basic principle of the diesel internal combustion engine: self-ignition, upon compression, of the fuel oil-air mixture. The basic diesel hammer employs a ram which functions as a piston, operating within a cylinder. By mechanical means, fuel oil is injected into the cylinder as the ram drops. As the heavy ram falls, it strikes an anvil and compresses the fuel-air mixture to the ignition temperature. The resultant explosion drives the ram upward and the anvil downward upon the cap of the pile being driven. As the ram is forced upward, exhaust ports release the combustion gases, completing the cycle.

Like conventional hammers, of course, diesel hammers operate in leads and can be worked at batter angles. Inasmuch as the gravity fall of the ram is utilized to start the initial cycle, inversion of the hammer to permit its use for pile extraction is not possible.

Three manufacturers are supplying diesel pile hammers to the railroad and construction industries. The Delmag diesel hammer, developed in Europe, is available in three sizes from the Foundation Equipment Corporation, Newcomerstown, Ohio. Link-Belt Speeder diesel pile hammers (successors to the Syntron line of diesel hammers) are available from the Link-Belt Speeder Corporation, Cedar Rapids, Iowa. McKiernan-Terry diesel hammers are produced by the McKiernan-Terry Corporation, Dover, N. J.

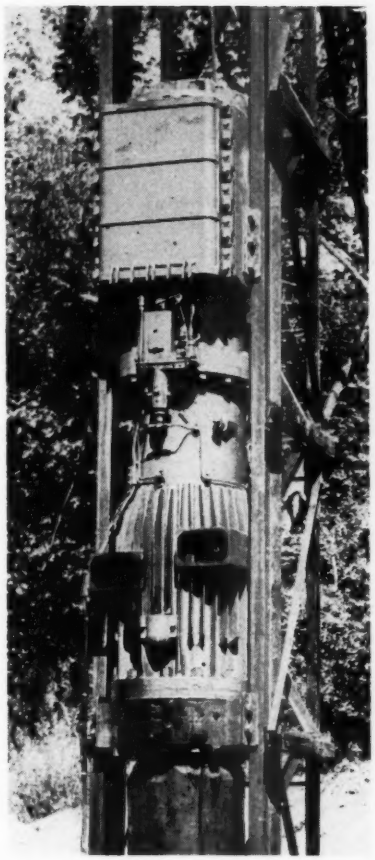
Each of these manufacturers produces diesel pile hammers which operate on the basic two-cycle diesel principle. There are, however—and naturally—basic differences in construction and operation among the three. Let us objectively examine the operational features of each.

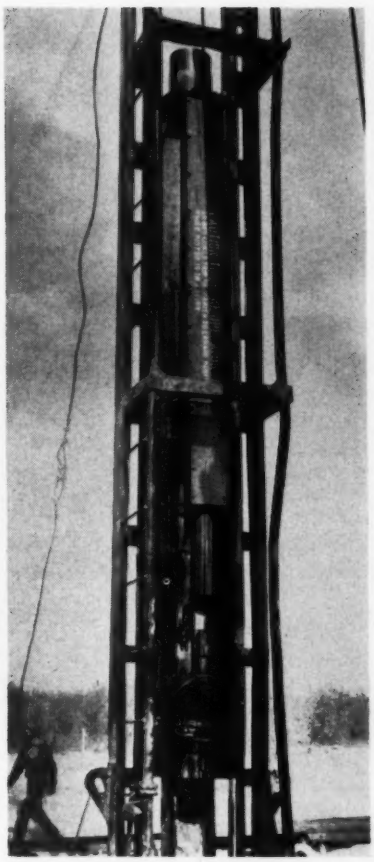
Before discussing specifications such as ram weights, fuel injection systems, stroke frequencies, and so forth, we must first recognize the basic operational differences between the three makes of hammers. The accompanying diagrams will help illustrate these features.

The McKiernan-Terry hammer has a ram which, on the upstroke following ignition, extends up and

sel pile hammers

	McKiernan-Terry Models		Delmag Models		
	DE-30	DE-40	D-5	D-12	D-22
	3,000	4,000	1,100	2,750	4,850
	48-52		50-60	50-60	50-60
	18,000		9,100	22,500	39,700
	2.0	NOT YET IN PRODUCTION	0.7	1.8	3.3
	25		DATA NOT AVAILABLE		
	10,600		2,220	5,230	8,800





RIGHT—The Link-Belt Speeder diesel pile-driving hammer in position in leads. This hammer incorporates a glow plug which extends into the combustion chamber to expedite starting in cold weather and soft earth.

FAR RIGHT—The McKiernan-Terry diesel hammer, like the Delmag, has its cylinder open at the top and utilizes a low-pressure fuel injection system.

out of the upper end of the cylinder. The anvil is an integral part of the cylinder assembly.

The Delmag hammer also has a ram which extends from the upper end of the cylinder on the upstroke. The anvil of the Delmag hammer, however, is separate from the cylinder and forms, in effect, a second piston within the cylinder.

The Link-Belt Speeder hammer, on the other hand, differs markedly from the others in that the ram does not extend out through the top of the cylinder. Instead, the cylinder is closed at its upper end, forming an air chamber or "bounce cylinder" wherein air is compressed between the cylinder head and the ram on the ram upstroke. The bounce chamber, by shortening the ram's upward stroke, doubles the number of blows per minute without loss in the per-blow energy output.

Fuel injection was a decided problem in the preliminary design of the first diesel pile hammers. It is interesting to note the systems which have been devised by the three manufacturers in this regard. The McKiernan-Terry hammer utilizes a cam-operated fuel-metering pump. During the downstroke, the ram engages the cam which, in turn, actuates the pump. When this occurs, fuel is injected at low pressure into the cylinder. This fuel falls, in advance of the descending ram, to the face of the anvil where it is atomized by the impact of the ram striking the anvil.

The Delmag hammer employs a fuel injection system basically similar to that of the McKiernan-Terry hammer in that a cam-actuated pump injects the fuel from a point above the anvil and at a comparatively low pressure.

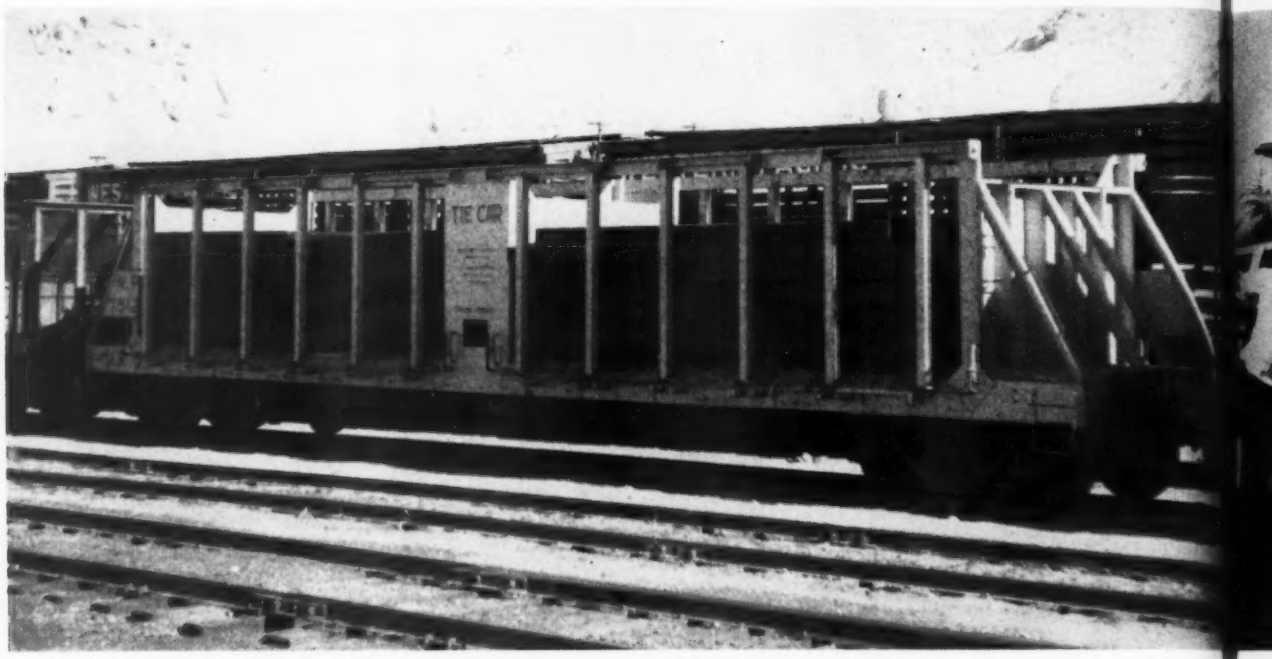
The Link-Belt Speeder hammer also incorporates a cam-follower actuated fuel pump. This hammer, however, employs high-pressure injection nozzles which spray the liquid fuel into combustion chambers which are dished-out contours in the anvil face. This hammer also incorporates a glow plug in the combustion chamber to facilitate cold-weather starting and starting in soft earth.

All three makes of hammers incorporate integral fuel tanks of various capacities and means for lubricating the ram pistons. All the hammers can be fitted with caps or bases to accommodate wood, concrete, fluted steel, sheet and sectional piling of various sizes. The hammers are all started in basically the same manner: the ram is lifted to a predetermined point where a release latching mechanism causes the ram to fall freely within the cylinder which rests upon the pile cap. In the case of the Link-Belt Speeder hammer, the ram down-stroke is accelerated by the compressed air in the "bounce cylinder."

Adjustment of the fuel pump in the McKiernan-Terry and Delmag hammers permits varying the force of the blow. On the Link-Belt Speeder hammer, a separate throttle control is incorporated which, hydraulically operated and installed in the crane cab, by which the crane operator can vary the force of the blow from idle to full power and also stop the hammer.

Basic operating specifications, dimensions, etc., are contained in the accompanying table for the various models of diesel hammers built by the three manufacturers. The material contained in this table has been derived from the manufacturers' literature and *RT&S* assumes no responsibility for its accuracy.

Car has side stakes hinged at the top so they sw at



This special car for ties spee ls

The Western Pacific estimates it is shaving about 8.6 cents per tie off the cost of distributing crossties from conventional gondolas. This saving is being accomplished through the use of a specially designed car having side stakes, hinged at the top, which swing out at the bottom to allow the ties to be discharged. The cars are downgraded flats that are being converted at a cost of $3,850 per car.

• The track foreman had just run a test on a new special tie car developed on the Western Pacific. He had unloaded two car loads of ties over a distance of about 2½ miles, one from the special car and the other from a gondola. Here's the gist of what he reported:

Using five laborers the 455 ties in the gondola had been unloaded in 1 hr 15 min. In contrast, four men required only 30 min to unload 396 ties from the special car. But the saving in time wasn't the only advantage noted by the foreman. "With the new car the men could simply push the ties out the sides with shovels or bars. They didn't have to handle them with their hands or lift them over the sides. As a result the work was not only easier and faster but the hazard of injury was greatly reduced."

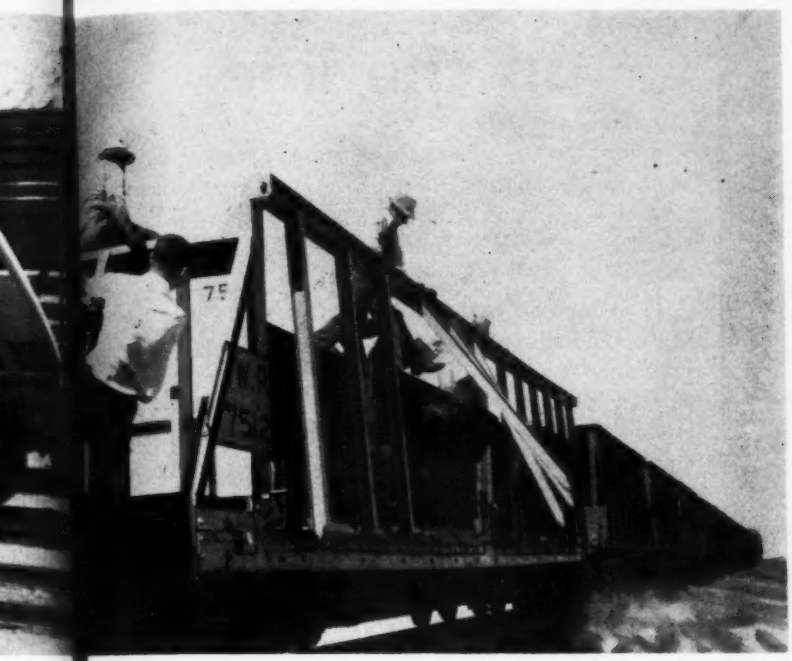
The WP's new tie car was developed with the objective of reducing the cost of distributing ties. At the time the development work was undertaken the road's practice was to unload new crossties at stations from which they were distributed as needed by the section forces. What it wanted was a car from which ties could be unloaded easily and economically along the track at the points of use.

Several considerations dictated the general characteristics of a car that would serve the road's requirements. One of these was the desire to have a car from which the ties could be unloaded so that they would fall longitudinally with the track. Another was the fact that the car had to be capable of handling ties 8 ft, 8 ft 6 in and 9 ft long. Finally, it was felt that there would be advantages in having a car that would be capable of handling bridge timbers as well as crossties.

These considerations, plus careful studies of several possible designs, led to the decision to design a car with side stakes hinged at the top so they could swing out at the bottom. The basic cars could be either downgraded stock cars or flat cars, whichever were most readily available. The final decision was to use, for the most part, downgraded 50-ft flat cars with a capacity of 50 tons.

As rebuilt for handling ties, each car has a steel bulkhead at each end and one at the center. These divide the car into two compartments each 19 ft 2 in long. This space is adequate for two piles of ties in each compartment. The bulkheads provide the supports for top rails on each side, consisting of steel channels, from which the swinging side stakes are hung. These latter, consisting of H-sections, are spaced 3 ft 5 in apart. The swinging feature of the stakes is provided by the fact

ey sw at bottom, causing ties to fall lengthwise with track



pee loading, cuts costs

that a steel rod is threaded through holes in the webs at their upper ends.

How side stakes are locked

The lower ends of the swinging stakes may be locked in position by longitudinal rods, each of which engages the lower ends of three stakes. At one end of each rod is a handle, placed at right angles to the rod, which is held in the closed or locked position by a wedge bar and link arrangement. To free the lower ends of the stakes the link is loosened and slipped over the end of the handle, allowing the latter to be pulled down.

So that the bottom crossties in a load may be easily skidded to the sides of the car, lengths of scrap rail are fastened transversely to the floor of the car at intervals ranging from 3 ft 4 in to 4 ft 8 in. Between these rails the decking consists of timber planks, 2⅜ in thick.

To assure that the ties will fall clear of the track, deflector plates are provided along both sides of each car. These consist of steel plates welded to supporting brackets so constructed that the plates slope downward from the side of the car at slightly less than 45 deg.

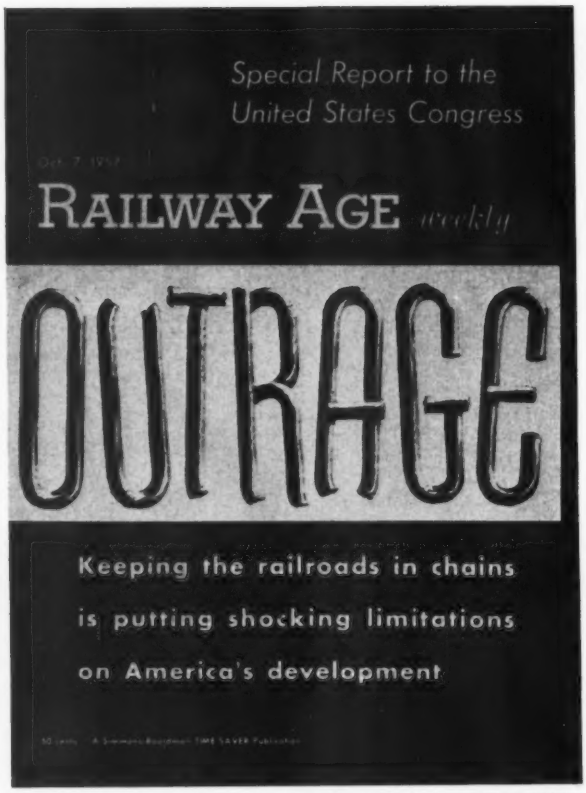
All ties used on the WP are treated at a commercial creosoting plant at Stockton, Calif. The ties are loaded by fork-lift trucks, generally to a depth of nine layers. To prevent the ties from slipping sideways in transit, 1-in by 2-in timber divider strips are placed crosswise in the car at intervals of three layers.

Each of the cars has a capacity of from 396 to 420 crossties, or an average of 14,000 bd ft, according to Frank R. Woolford, chief engineer. He anticipates that about 50 of the cars will be needed to handle the road's entire crosstie requirements. To date 11 of them have been placed in service. The work of converting flat cars into the tie cars is being done in WP shops at an estimated cost of $3850 per car.

Various tests to determine the economy of the new cars over gondolas have been made in addition to the one already mentioned. In one case, where ties were being unloaded into piles for a siding extension, one of the special cars was unloaded in 4 min 40 sec, whereas 8 min 45 sec was required to unload a gondola. The same number of men was used in each case. In another instance, when the ties were being distributed along the track, 792 ties were unloaded from two special tie cars in 45 min by 12 laborers, whereas 15 laborers required an hour to unload 682 ties from two gondolas. (The unloading of individual ties while the train is moving is, of course, a slower operation than when standing cars are unloaded at one spot.

Here is what the cars save

Based on a series of tests the road estimates that the labor cost of unloading ties from conventional gondolas comes to $.05068 per tie, while the cost of work-train service when such cars are used is $.06932 per tie, a total of $.12. With the special car the labor cost is $.01339 and the work train charge is $.02070, a total of $.03409.



Government treatment of railroads is an OUTRAGE.

Laying RR story on the line

• Restricted by an archaic system of regulation, taxed to near confiscation by unequal laws and forced to compete in a fairlyland of subsidized competition, today's railroads are forced to do business under conditions like no other industry.

These were the cards put squarely on the table in the October 7 Railway Age—companion publication to this magazine. In a Special Report to Congress, Railway Age charged that competitors to railroads "have been given every card in the deck." No wonder railroad earnings are low, no wonder railroads have a tough time obtaining funds just to stay even. The page reproductions shown here illustrate how that message was presented.

The report stressed how railroads, in imaginative management, inventiveness and advanced engineering, are second "to no other industry." But, the report said, railroads aren't allowed to do the job they could do because they're being choked to death "by inequalities and an archaic system of regulation established in the last century."

Who's kidding whom...

...that trucks, cars, and buses could carry the full load

Trains have been, are, and must continue to be the bedrock foundation on which America is built.

Everywhere, these days, the happy sounds of prosperity lies across the land. The nation's factories and farms take in vast stores of supplies and pour out goods in a fantastic river—a river that reaches into every city and hamlet. Yet every molecule of this output, every refrigerator, every bushy of coal, every grain of wheat must be moved from where it's produced to where it can be used. Without modern transportation, this country could not prosper. No other area of the world depends on transportation as North America does.

It is not difficult to assay the value of America's railroads today. They alone provide the really vital low-cost long-and-short-haul mass transportation. They keep prices from booming, safeguard nationwide markets and protect millions of jobs. Without trains, west coast fruits would have no market in the east, prices of eastern products would soar in the west. Basic raw materials would skyrocket in cost. Take a look at a single figure: to move a ton of freight a mile costs an average of 1.5 cents by rail, over three times that much by highway.

The last war gave us a good look at the basic importance of trains. With autos rationed, gasoline rationed, tires rationed, where would we have been without our trains?

Only railroads have the built-in capacity, the elasticity to expand swiftly, expertly and safely in wartime emergencies. Small wonder the industry still talks proudly of what it did in World War II. Unlike trucks, or airlines, or automobiles, or other transportation agencies, the owners of the railroads enabled them to accomplish a modern transportation miracle. Faced with the same shortages, the same restrictions in materials and manpower, they swelled their ton-mile output to vast proportions. Look at the record: they moved nearly twice their prewar volume of freight and better than three times their pre-war passenger traffic.

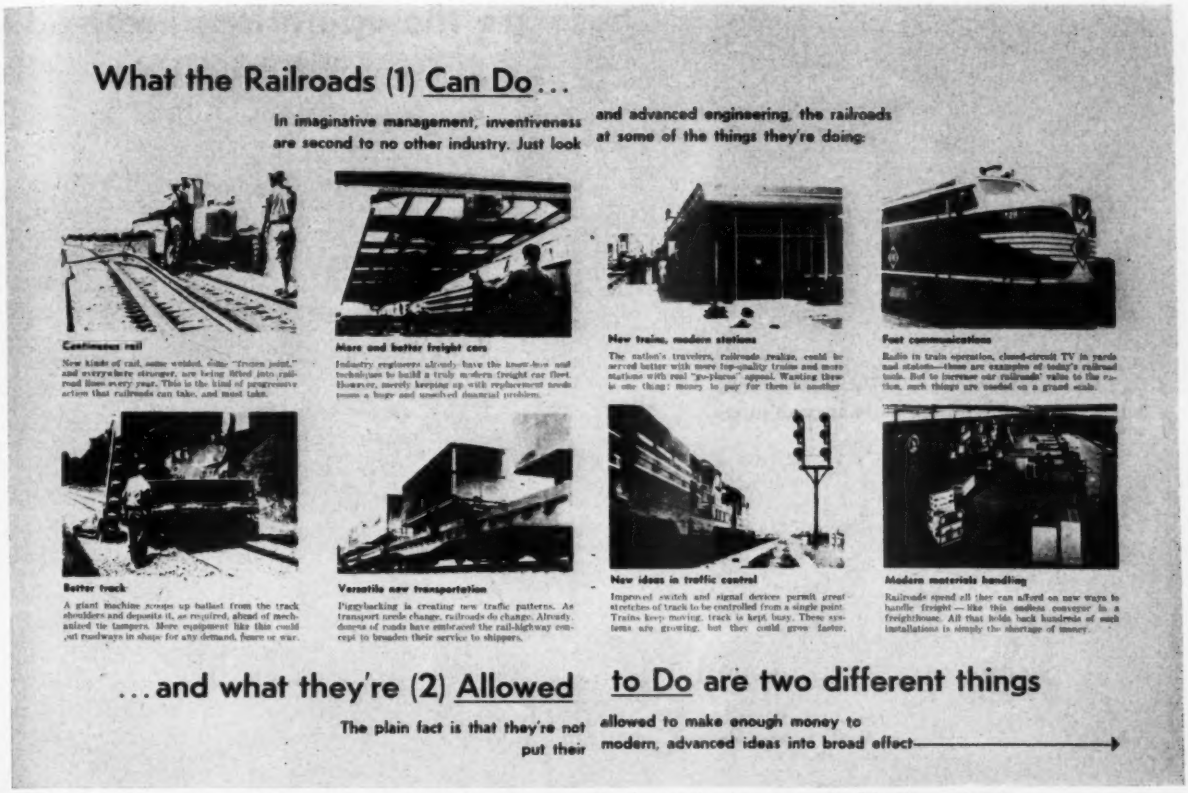
Without the railroads' inherent resilience and adaptability, America couldn't have made the grade. Detroit's tanks could not have won battles in Germany. If this wartime experience proved anything, it's this nation's stake in a strong and modern railroad system. The country simply must keep its defenses ready.

Yet the railroads today are being choked to death by inequalities and an archaic system of regulation established in the last century. If this strangulation of our "low cost mass transportation carrier" continues, what will be the future of our cities, our highways, our defense, our ability to compete for world markets?

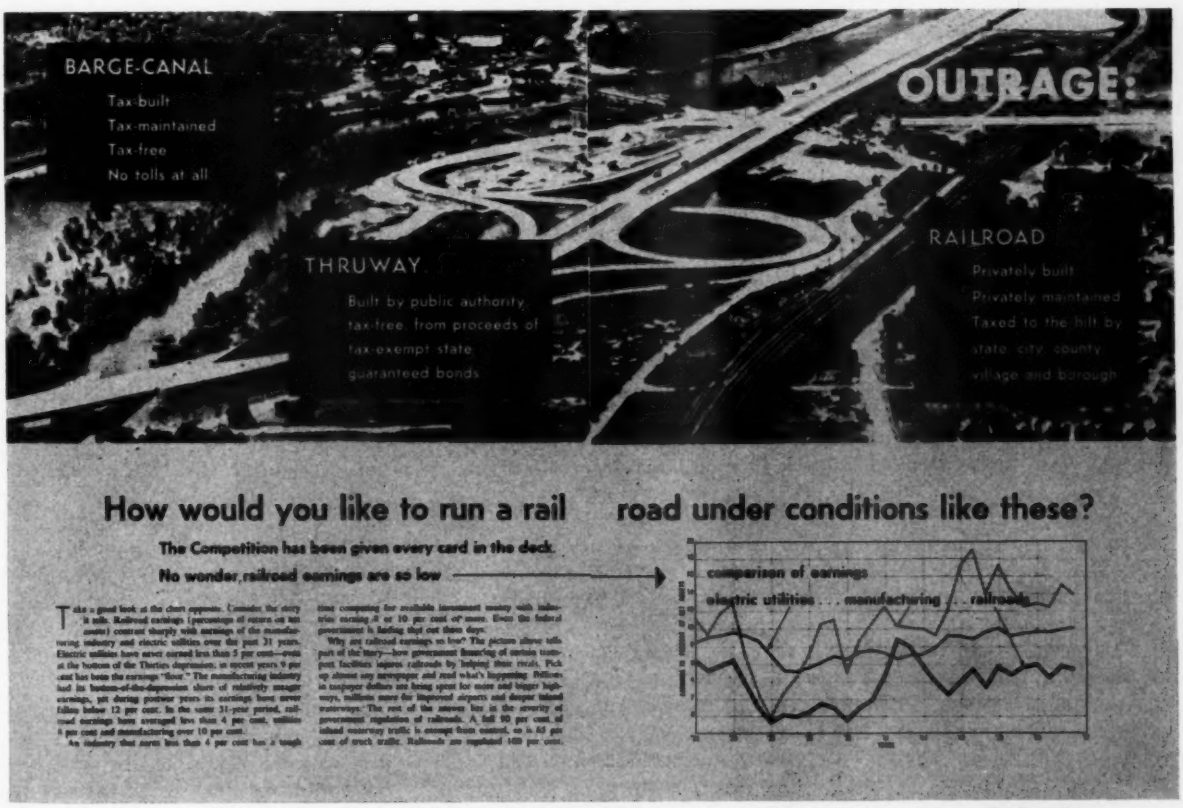
What's happening to the railroads? Far from expanding, many of them are having to contract and retrench. There are today 40,000 fewer freight cars than just ten years ago, 7,000 fewer passenger cars than when World War II began. Trucks in service have declined by 15,000 units since 1940. To put it bluntly, our railroads are having a tough time trying to hold their own, to stay as big and as vital as they once were. An industry grows or it gets. Restrict the railroads, bind them, hold them back, keep them non-competitive in a competitive economy and who gains? Nobody, for very long. As railroads ride into a crisis of misunderstanding, inattention and neglect, so does every producer and every consumer, every citizen and every city.

Just see how desperate the railroad situation really is——→

The nation needs it's railroads. They're the one really vital "low cost common carrier."

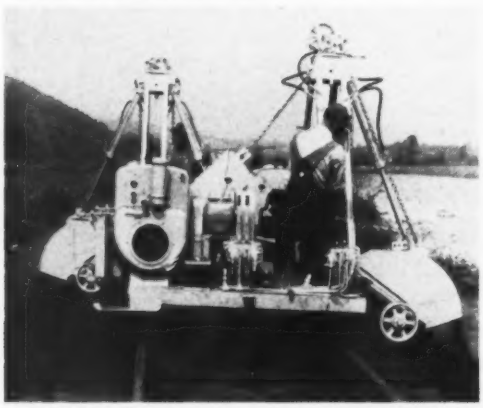

What the Railroads (1) Can Do...
In imaginative management, inventiveness and advanced engineering, the railroads are second to no other industry. Just look at some of the things they're doing:
Continuous rail
New kinds of rail, some welded, some "frozen joint," and everywhere stronger, are being fitted into railroad lines every year. This is the kind of progressive action that railroads can take, and must take.
More and better freight cars
Industry engineers already have the know-how and technicians to build a truly modern freight car fleet. However, merely keeping up with replacement needs poses a huge and unsolved financial problem.
New trains, modern stations
The nation's travelers, railroads realize, could be served better with more top-quality trains and more stations with real "go-places" appeal. Wanting these is one thing; money to pay for them is another
Fast communications
Radio in train operation, closed-circuit TV in yards and stations—these are examples of today's railroad tools. But to increase our railroads' value to the nation, such things are needed on a grand scale.
Better track
A giant machine scoops up ballast from the track shoulders and deposits it, as required, ahead of mechanized tie tampers. More equipment like this could put roadways in shape for any demand, peace or war.
Versatile new transportation
Piggybacking is creating new traffic patterns. As transport needs change, railroads do change. Already, dozens of roads have embraced the rail-highway concept to broaden their service to shippers.
New ideas in traffic control
Improved switch and signal devices permit great stretches of track to be controlled from a single point. Trains keep moving, track is kept busy. These systems are growing, but they could grow faster.
Modern materials handling
Railroads spend all they can afford on new ways to handle freight — like this endless conveyor in a freighthouse. All that holds back hundreds of such installations is simply the shortage of money.
...and what they're (2) Allowed to Do are two different things
The plain fact is that they're not allowed to make enough money to put their modern, advanced ideas into broad effect

Railroads are progressive and anxious to grow; only the lack of money holds them back.



But what happens? Competitors continue to get government help and grow stronger all the time.

1. Jack-All raised the track 2 in. in advance of the undercutting operation.



2. Crib ballast was removed by Two-Wheel Kribbers operating in tandem behind the Jack-All.

These are the operations involved in th[de]

From cinders to stone . . .

Undercuts on reballasting job

• A new approach to the problem of renewing ballast with a minimum track raise is in use on the Reading. Key machine in the method being used is a Kershaw Undercutter and Skeletonizer which removes the old ballast and lowers the track so that when the track is raised on new ballast the amount of the raise is held to a minimum.

This operation is being carried out on 15 miles of track near Sunbury, Pa., on the Reading's line between Shamokin and Newbury. The purpose of the work is to strip the track of the old cinder ballast and to replace it with stone ballast to a depth of approximately 6 in under the ties. About 2000 ft per day is the rate at which the work is being done. Equipment being used consists of two Jack-Alls, two, Two-Wheel Kribbers, the Undercutter and Skeletonizer, a Jordan Spreader, a Jackson Track Maintainer, and a Ballast Regulator.

Here's how the job is being done:

A Jack-All at the head of the gang raises the track 2 in and tamps the ties at the jacking points. Next come the Two-Wheel Kribbers which remove the old ballast from between the ties, pushing it out to the shoulders. These are followed by the Undercutter which removes the old ballast to a depth of 3¼ to 4 in under the ties, placing it on one side of the track. The Jordan Spreader then disposes of the old ballast by spreading it along the subgrade shoulders.

The undercutting operation proceeds at an average rate of 400 ft per hour, although the production has been as high as 625 ft per hour.

Every second day new ballast is unloaded and the track is raised to grade and tamped. The raising is done by the second Jack-All and the tamping by the Track Maintainer. After the track has been lined the ballast is dressed and shaped by the Regulator.

Tie renewals are made in advance of the undercutting operation and necessary respacing of the ties is done while the track is in a skeletonized condition.

in th dercutting operation. Then . . .

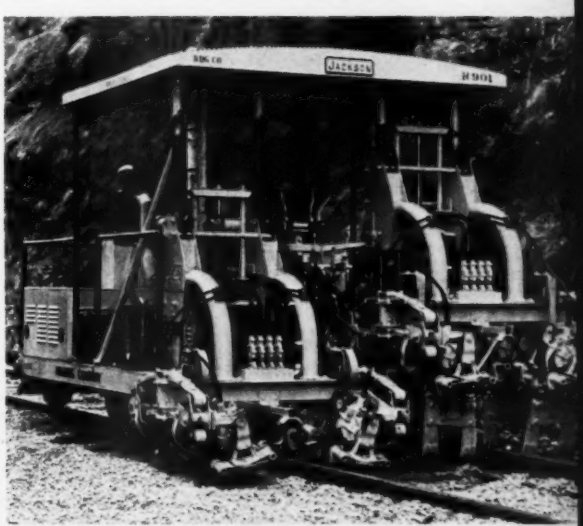
3. Undercutter uses endless chain to remove 3¼ to 4 in of ballast from under ties.

4. Respacing of ties is carried out directly behind Undercutter. Tie renewals were made in advance of operation.

5. Old ballast piled up along track by Undercutter is leveled by Jordan Spreader.

. . . new ballast is distributed and the track raised and tamped.

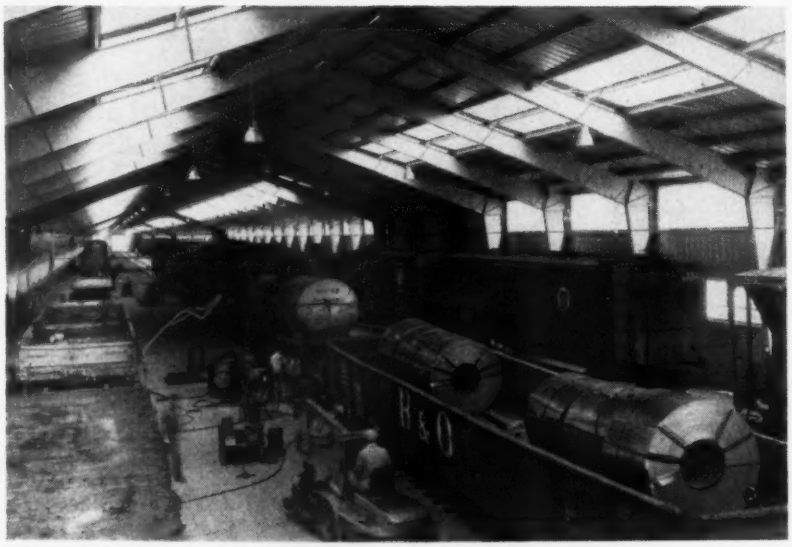
Track is raised on new stone ballast by second Jack-All in preparation for final tamping. Sighting is done by instrument mounted on rolling tripod.



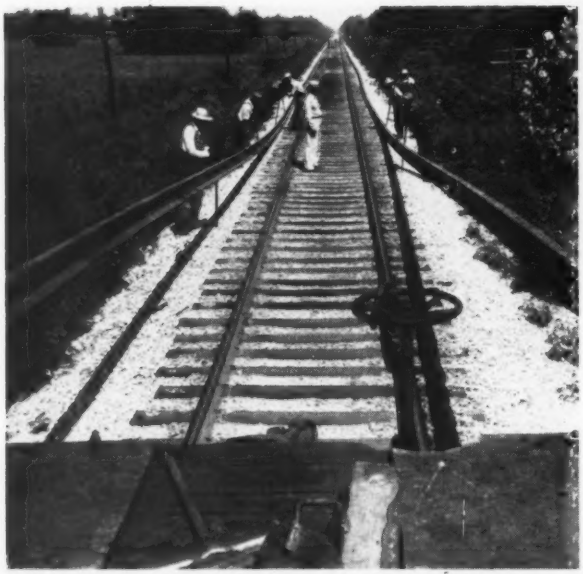
Tamping is done by Track Maintainer. Ballast was then dressed by Regulator and lined.

News briefs in pictures...

CLASSIFICATION YARD at the L&N's new Hills Park yard near Atlanta, Ga. This view, looking north, shows the main yard office at left and retarder tower, left center. New yard has 752-car capacity and can handle up to 2,000 cars per day.



CORWITH YARD, the Santa Fe's extensive facility at Chicago, now boasts this quarter-mile long car repair shed. Building is of rigid frame construction and is covered with corrugated aluminum. Standard windows and translucent skylighting are incorporated to provide maximum interior visibility.



LONG RAIL goes down on the Frisco. Six miles were laid this year just north of Amory, Miss. Plans include the laying of additional welded rail next year. Rail, 132-lb, is guided by roller assemblies on end flat car of rail train.

BULLDOZER attachment, in lieu of conventional bucket, is used on this Caterpillar No. 955 Traxcavator as grading is carried out to complete a new two-mile spur track on the Albany & Northern near Warwick, Ga.

THE NEW LOOK IN RAILROADING:

Nothing but the best!

Great Northern's new classification yard at Minot, N. D., features latest in push-button facilities and heavy-duty trackwork and specialties

"We wanted nothing but the best for this yard—push-button, automatic classification; complete facilities; heavy-duty mainline trackwork and equipment—the works." That is the way one Great Northern official expressed it and that is what they got: The Gavin Yard at Minot, N. D., is one of the most modern and efficient classification yards in the country and a symbol of railroading's new look, consisting of the latest and the best.

The Great Northern has invested $6,500,000 in the Gavin Yard and feels that it is worth every cent. With its radar- and computer-controlled retarders; push-button automatic switching; a vast network of communications; complete supporting facilities, its strong backbone of 50 classification and storage tracks, plus 6 receiving and departure tracks, all equipped with new Racor turnouts, fully protected by lubricators, Snow-Blowers and No. 22 switch stands, the Great Northern has sliced off huge chunks of time on its freight runs through the heart of America's wheat country. Moreover the railroad feels that it has not only a yard that represents the peak of efficiency, but one that will stand up to the punishing wear of moving today's tonnage faster than ever before.

A philosophy of the best.

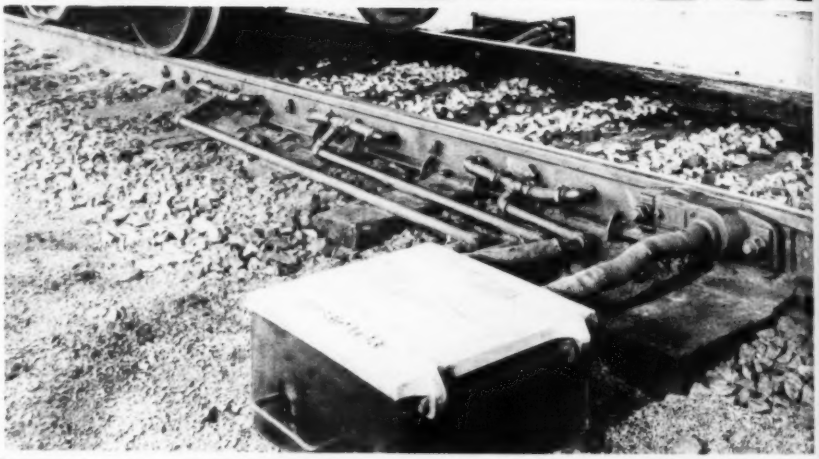
The Great Northern's philosophy of asking for the best can be seen in the specifications for trackwork given to American Brake Shoe's Railroad Products Division: descriptions of turnouts include manganese switch point guards; security braces; samson switch points; "MJ" rods; integral base, integral tie plate, solid self-guarded manganese frogs. To protect this equipment two Racor Lubricators were ordered, and all switches in the humping area were provided with Racor Snow-Blowers, having automatically controlled cycling.

This viewpoint also represents the philosophy of American Brake Shoe, who supplied the equipment. Heavy-duty manganese trackwork is the logical answer to the greater punishment handed out by today's increased freight tonnages and heavier traffic. The classification yard carries more responsibility than ever for the efficient operation of a railroad; it deserves the best.

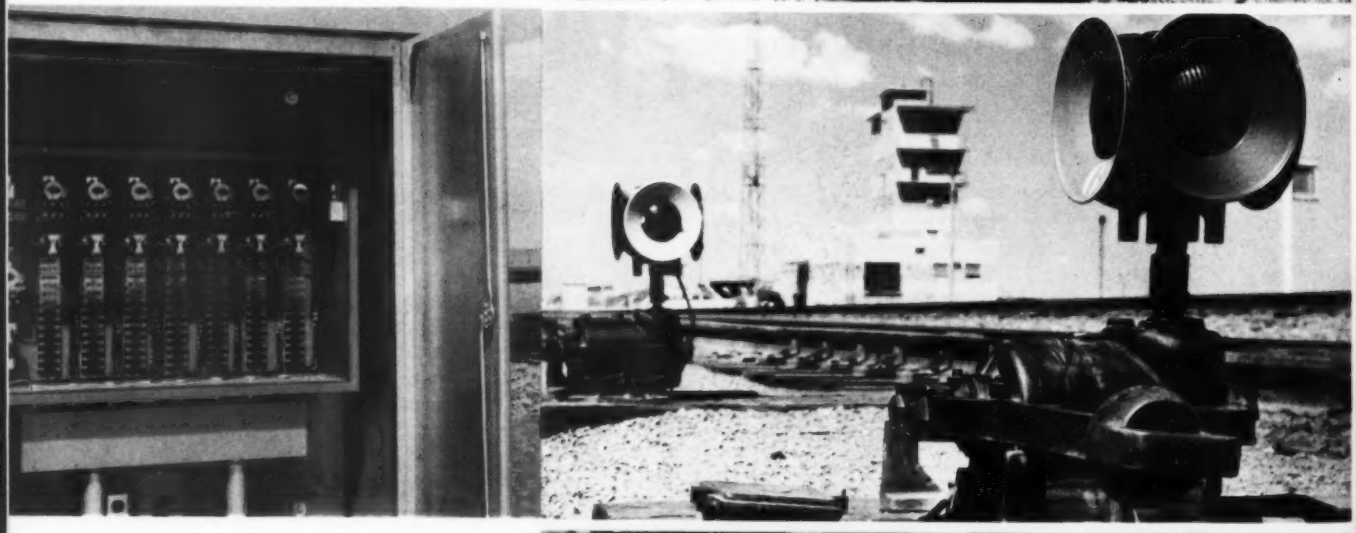
AMERICAN Brake Shoe

One of five Racor® lap turnouts at head end of yard. New, heavy-duty equipment, they are furnished with manganese switch point guards, security adjustable braces, samson switch points, "MJ" rods, Snow-Blowers. The head end also required 31 Racor No. 9 turnouts, standard and equilateral, similarly furnished. The classification and storage tracks and switching leads contain 127 Racor No. 9 and 12 Racor No. 11 turnouts.

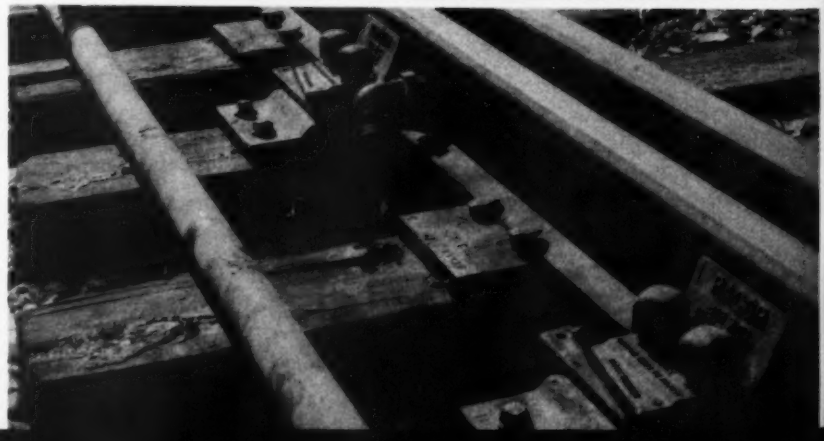
Two Racor Lubricators are strategically placed on the hump to provide rail and turnout lubrication and more uniform rollability throughout the yard.



Racor heavy-duty No. 22 switch stands, 138 in all in the Gavin Yard, are used where switches are liable to be run through accidentally. When this happens, switch points are partly opened by the wheel flanges, and the throw automatically completed by the switch stand, including rotation of the target lamp. This will avoid damaged switches, operating delays, cost of rerailing cars and locomotives and repairing switches.

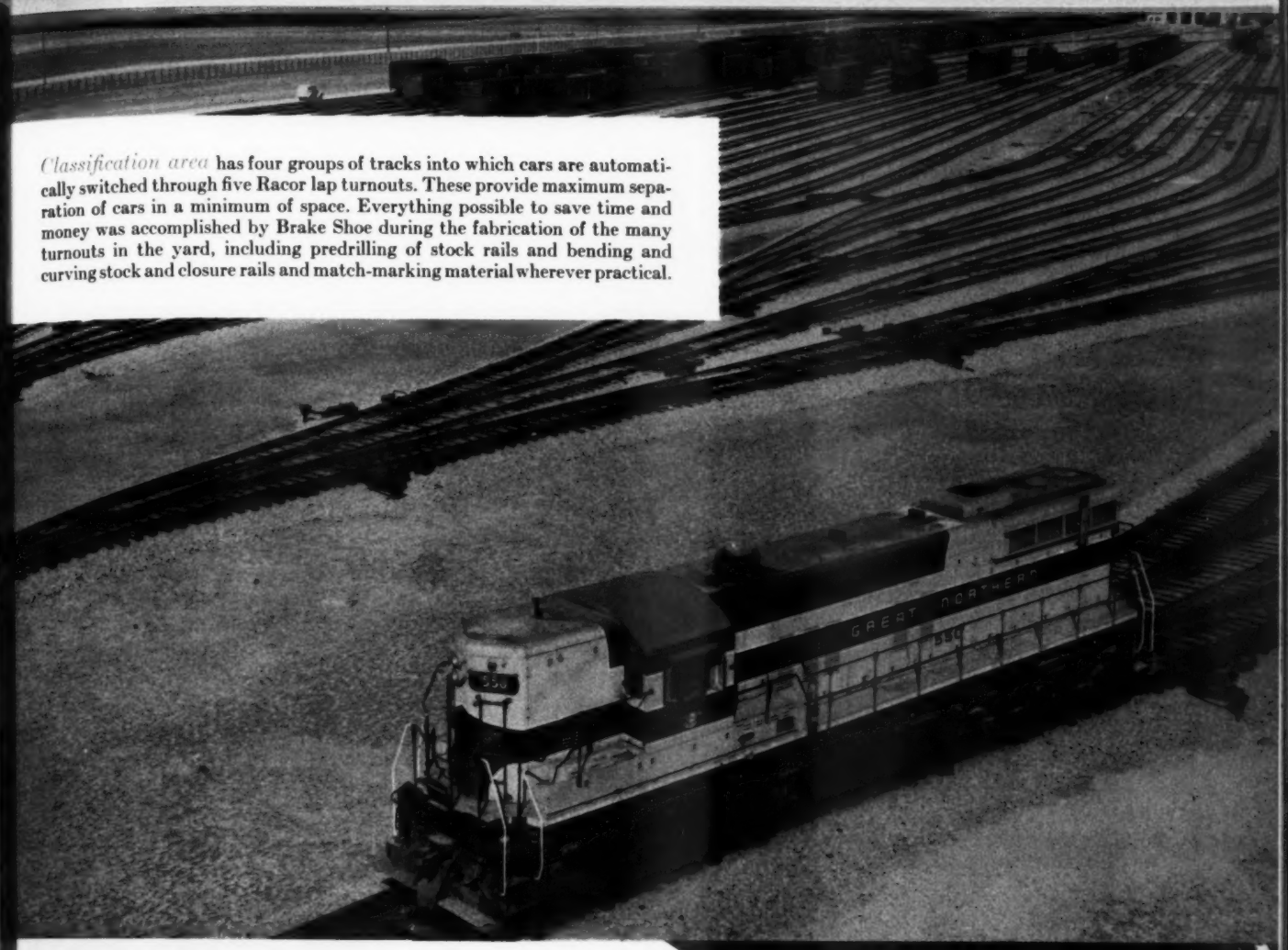


Snow-Blower electric control panel automatically controls cycling of Snow-Blowers. It can be set to average conditions or individually adjusted.

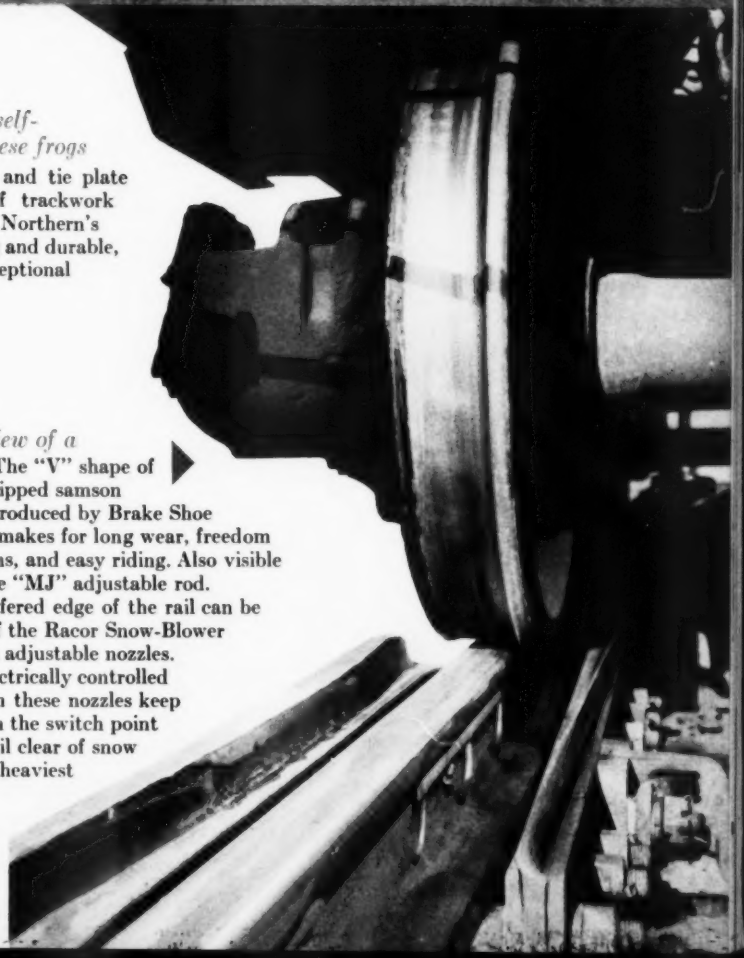


Racor security adjustable rail braces afford maximum bracing of stock rail, simple installation, and provision for adjustment to take up wear.

Classification area has four groups of tracks into which cars are automatically switched through five Racor lap turnouts. These provide maximum separation of cars in a minimum of space. Everything possible to save time and money was accomplished by Brake Shoe during the fabrication of the many turnouts in the yard, including predrilling of stock rails and bending and curving stock and closure rails and match-marking material wherever practical.



Massive, Racor self-guarded manganese frogs with integral base and tie plate indicate quality of trackwork used in the Great Northern's Gavin Yard. Strong and durable, they have an exceptional service life.



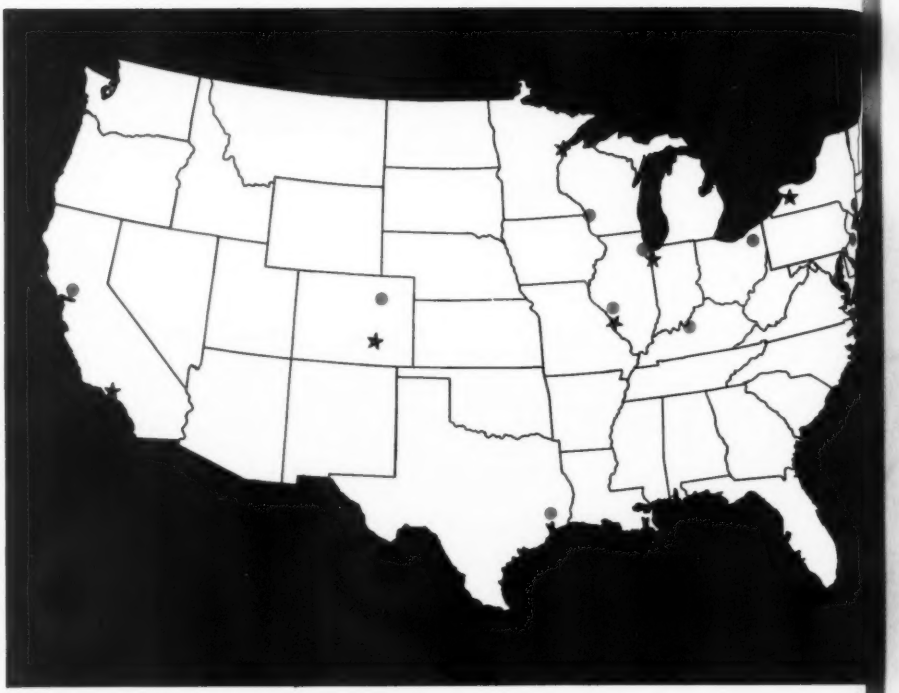
Wheel's eye view of a switch point. The "V" shape of the manganese-tipped samson switch point, introduced by Brake Shoe in this country, makes for long wear, freedom from break-downs, and easy riding. Also visible is the Racor type "MJ" adjustable rod. Under the chamfered edge of the rail can be seen a portion of the Racor Snow-Blower manifold and its adjustable nozzles. Intermittent, electrically controlled blasts of air from these nozzles keep the area between the switch point and the stock rail clear of snow during even the heaviest prairie storms.

A Convenient Source of Supply

For your Frogs, Switches and Crossings

America's most complete line of Track Specialties

- Depth hardened manganese steel crossings
- Manganese steel guard rails
- Vertical switch rods
- Switch point locks
- Automatic switch stands
- Samson switch points
- Snow-Blowers
- Switch point guards
- Rail and flange lubricators
- Adjustable rail braces
- Dual spike drivers
- Tie pads
- Racor studs



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An important part of our service lies in making available to the railroads our wealth of engineering experience — *practical* experience that comes from many years of designing and manufacturing trackwork and specialties . . . *advanced* experience that is solving tomorrow's railroad problems today in our modern research laboratories ▲ . . . *rounded* experience that has been tested and proven in trackwork installations throughout the country.

One such installation is the Great Northern's Gavin Yard at Minot, North Dakota, shown on the previous pages. Racor is proud of the part it played in making this one of today's most modern and efficient classification yards.

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RAILROAD-MEN in their thinking . . . railroad-men in their doing, Morrison-men are quick to recognize what the railroad industry needs to help it operate and profit.

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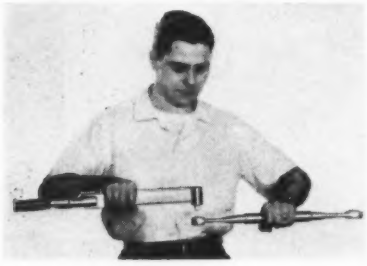
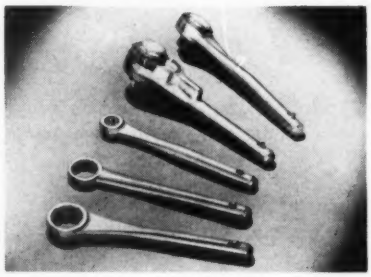
Products



Greater range for . . .

Torque wrench

BY USING a new series of adapters, the range of conventional lightweight, small-size and low-capacity torque wrenches may be increased as high as 900 ft-lb. A normal 150-ft-lb capacity torque wrench can be increased for application to as high as 300 ft-lb; a normal 200-ft-lb torque wrench to as high as 400 ft-lb and a normal 300-ft-lb to 600 or 900 ft-lb. Because of the pivoted handles of the torque wrenches offered with this combination, the manufacturer states that they may be used for extremely accurate applications with multi-range adapters.



Hence, a single torque wrench of conventional size which meets the majority of requirements may, by the addition of an adapter, be used to cover the remainder of torque requirements.

The torque-wrench adapter is a heavy-duty, lightweight hand tool which enables using box-end openings, rachet-end or conventional drive-square so that sockets can be used. Each of the adapter-end accessories may be interchanged and yet maintain the proper lever length of the adapter. Box-end openings are available from ¾ in to 2½ in. *P. A. Sturtevant Company, Dept. RTS, Addison, Ill.*

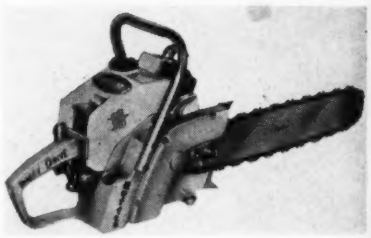
For hard digging . . .

Ripping bulldozer

A NEW earthmoving tool, designated the Gyrodozer, combines the functions of ripping and moving materials in one bulldozing operation. It is a bulldozer attachment for the Caterpillar D7 tractor and is designed to produce full blade-loads in less time and shorter distances when working in hard-to-handle materials.

The Gyrodozer has four penetrating teeth mounted on the cutting edge of the bulldozer blade and they extend forward 23 in. To facilitate any desirable ripping angle of the teeth, the blade is capable of being tipped forward and backward, and of being tilted 3 ft to either side. Tilting action is provided by two hydraulic cylinders mounted on the blade in place of tilt braces. Raising and lowering of the blade is controlled by a No. 25 Cable Control. A No. 44 Hydraulic Control is used to govern tip and tilt actions of the blade. Full positioning of the blade can be accomplished during operation through two levers located to the right of the operator.

Some of the features cited by the manufacturer for the Gyrodozer are: Greater penetrating efficiency; better conditioning of stubborn materials; less "corduroy effect" when dozing; better control of the penetration and surfacing of the moldboard; full width of the blade kept in contact with the load on slopes up to 20 deg; useful for surfacing boulders or removing small trees; and better handling of rocks and small boulders with less damage and lower maintenance costs of the blade. *Caterpillar Tractor Company, Dept. RTS; Peoria, Ill.*



"Plenty of go" for . . .

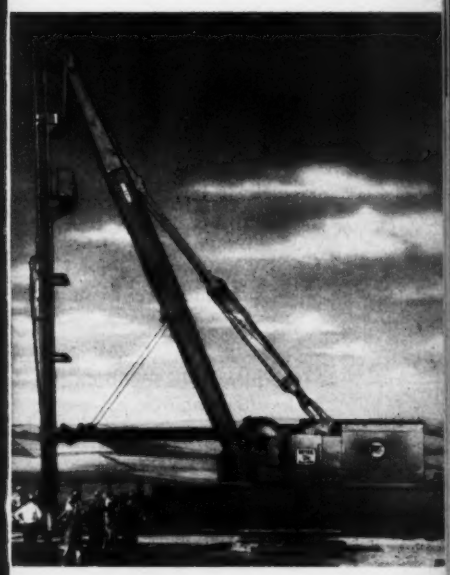
New chain saw

DESIGNED to meet specific field problems and conditions encountered by professionals in various regions is a new chain saw, designated Model 88M. It is available in three chain speeds (2200, 2300 and 2650) with chain bars up to 36 in and bow bars of 15 in and 18 in. It is powered by a West Bend 6.45-cu in displacement, long-stroke, two-cycle engine, complete with an all-position carburetor and high-tension magneto. The manufacturer states that this power plant assures "plenty of go" for the owner that a centered handle control and thumb-button oiler makes possible "balanced straight-line cutting." All copper fuel and oil lines have been eliminated to do away with trouble from this source and a shrouded carburetor is said to eliminate "air-filter frost-over" in freezing weather.

Double sprocket life is another feature of Model 88M. When the drive sprocket is worn on the outer edge, the bar can be removed, the spacer taken out and the bar replaced, after which the machine is ready for more service. Other features are a new shatterproof alloy and a weight four pounds lighter than the standard unit. *Hoffco, Inc., Dept. RTS, Richmond, Ind.*

ORTON

An ORTON Pile Driver *built to specification* hoists, rotates, travels and operates the pile-driver leads, powered by a GM diesel engine with fluid torque converter. Self propelled at 24 mph on level track. Easily negotiates 5% grade; pulls 10 loaded cars weighing 70 tons on level—or 1 such car on 4% grade. Hydraulic pumps and auger attachments. Ask for catalog No. 90.



ORTON cranes operate on STRAIGHT DIESEL POWER. This enables ORTON to give 10-year guarantee on travel gears without limitation due to accident, derailment, misuse or er cause. Idles at 600 rpm instead of 1800; reduces engine wear immensely; reduces fuel sumption to about ¾ of diesel electric operation. No danger of setting fire to combustible terial on road beds. Moisture—even flood waters, won't immobilize an ORTON straight sel machine.

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An ORTON *Combination* PILE DRIVER, 160-ton DIESEL WRECKER and BRIDGE DERRICK *built to specification*. Pendent pile driver leads permit batter in both directions. Can be equipped for use with air or diesel-operated hammer. Above: in use as a pile driver; large photo at left: same machine as a wrecker. Ask for catalog No. 89.

RAILWAY TRACK and STRUCTURES

What's the answer?

To be answered in February

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: December 31

1. Under what conditions is it possible to lay new rail on the existing tie plates? Where this is done, should the ties be adzed? Explain.

2. When a bridge is washed out or otherwise destroyed, what factors determine whether it should (a) be rebuilt immediately as a permanent structure, or (b) replaced by a temporary bridge? Explain.

3. Where the practice is followed of repairing driver burns by welding, should the work be done as the burns occur or as a part of an out-of-face program? Explain.

4. To what extent is it feasible to use "dry-wall" interior construction in railway buildings? What are the advantages? Disadvantages? Explain.

5. What methods can be employed to facilitate the starting of the engines of motor cars and other equipment in cold weather? Explain.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

Use of high-strength bolts

What, if any, are the objections to using high-strength bolts on railway structures in cold climates? Under what temperature conditions may they be safely used?

No objections

By E. J. RUBLE
Research Engineer Structures
AAR Research Center
Chicago

In discussing this question it appears that the following two distinct phases of the question should be considered:

(1) The objection to tightening high-strength bolts in low temperatures.

(2) The objection to the action of high-strength bolts, after their installation, in holding the steel parts together when the temperature is low.

In considering the first possible objection, it should be kept in mind that high-strength bolts are made from steel having a minimum carbon and manganese content of 0.30 per cent, a maximum phosphorous content of 0.048 per cent and a maximum sulfur content of 0.058. After forming the bolts, they are heat treated and then quenched in a liguid medium, usually oil. The bolts are then tempered by reheating to a minimum temperature of 800 deg F. This fabricating process results in a bolt having a minimum elongation of 14 per cent in 2 in and a minimum reduction of area of 35 per cent. One important feature in the fabrication of the bolts is that most manufacturers are now equipped to make the threads by rolling, at least in sizes normally used in structures.

It is very doubtful that high-strength bolts will be installed when the temperature is much below 0 deg F; however, it is possible that in an emergency some bolts will be installed and tightened by hand wrenches in temperatures as low as 30 or 40 deg F below zero and the static strength of the bolts at these temperatures must be considered.

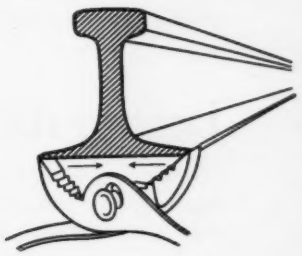
The effect of low temperatures on the physical properties of steels has been of considerable interest and concern to engineers for some time and many investigations have been conducted to determine these properties. The most recent work has just been completed at the University of Illinois for AREA Committee 15, Iron and Steel Structures, and the results can be found in AREA Bulletin 538. The results of these tests indicate that the tensile strength of the structural, low alloy and silicon steels actually increased with a decrease in temperatures to as low as —70 deg F, provided the edges of the steel specimens were not rough and jagged, such as that produced by a shearing of the edges. However, the harmful effect of the sheared edge was apparently alleviated by a subsequent flame softening treatment. Based on these tests, it appears reasonable to expect that the strength of the high-strength bolts, which are tempered by reheating after fabrication, would not decrease with a decrease in temperature.

In considering the action of high-strength bolts after their installation, it should be kept in mind that the coefficient of expansion of the steel in the bolts is about the same as the coefficient in the steel members that are fastened together. Therefore, the clamping action of the bolts remains about the same during a wide range in temperature.

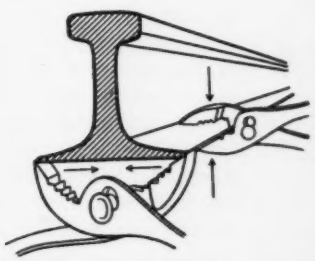
Tests conducted for the Research Council on Rivited and Bolted Structural Joints at the University of Illinois have shown that, after the bolts are installed and properly tightened, the clamping action or stress in the bolt does not change with a change in stress in the members connected. Even in such connections as wind brackets where the bolts would be loaded in direct tension, the stress in the bolt does not change until the

Here's how the BULLDOG anchor's two-way grip multiplies holding power

Compare the BULLDOG's holding power with any other anchor:



Most rail anchors grip the rail base like a single pair of giant pliers—with horizontal force.



The BULLDOG anchor grips the rail base like *two* giant pairs of pliers—with both horizontal and vertical force. Also, because of the integral design of the BULLDOG's two factory-assembled elements, the vertical force of the clamp maintains and sustains the horizontal force of the spring.

Listen to an engineer on stresses:

"Most rail anchors are simple one-piece torsion springs. They have a built-in resistance to distortion which is the force that grips the rail base. This horizontal force is similar to a giant pair of pliers squeezing the rail with constant pressure.

"The True Temper BULLDOG is also in effect a one-piece anchor because it is shipped, handled and applied as one piece. But it is manufactured in two pieces to provide two-way holding power.

"First, a spring is formed from resilient spring steel. It functions as other anchors described above—to grip the rail horizontally. Second—and here is where the BULLDOG is unique—a double-jawed clamp of hardened steel is fitted to the spring to add vertical force which grips the rail at the flange of the base. The over-all effect, to illustrate very simply, is that of two giant pairs of pliers—one gripping horizontally, one vertically.

"But the pliers analogy does not tell the whole story. The two pieces of the BULLDOG anchor, because of their integral design, actually multiply and sustain the gripping power of each other because they provide leverage for each other."

If you'd like to test the BULLDOG on your road, or if you'd like more information on how this amazing anchor can cut your track maintenance costs, contact your True Temper representative or write True Temper, Railway Appliances Division, 1623 Euclid Avenue, Cleveland 15, Ohio. No obligation, of course.

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TRUE TEMPER BULLDOG RAIL ANCHORS YOU CAN LOOK TO TT FOR LEADERSHIP

direct load becomes large enough to overcome the original clamping action.

Finally, in order to determine if high-strength bolts would perform satisfactorily in connections of railroad bridges where low temperatures are encountered, arrangements were made with the Great Northern and Northern Pacific railroads to install some experimental bolts in floorbeam hanger connections of several bridges in Minnesota, North Dakota and Wyoming where temperatures of -30 deg F to -40 deg F occur. These bolts were installed in November 1950 and periodic inspections since their installation have shown they are satisfactory.

In conclusion, my answer to the question is that there are no objections to the use of high-strength bolts on railway structures, even at extremely low temperatures.

Lighting station platforms

What type of lighting is most efficient to operate and maintain for station platforms—incandescent, flourescent, mercury-vapor, etc.? Explain.

All have application

By L. A. West
Assistant Engineer
Illinois Central
Chicago

Incandescent, fluorescent and mercury-vapor luminaries each can be utilized to provide an excellent lighting installation, and equal levels of illumination can be obtained. The size of the installation, the local conditions and requirements, i.e. the number of trains and number of hours that illumination is required, the first cost and the operating costs, all will vary and effect the choice.

Incandescent lighting has pleasing color, has a lower first cost of installation, is relatively simple to install and lends itself to numerous IES lighting patterns, thus making it possible to light only the area that is prescribed. The latter is due to the relatively small size of the light source. On the other hand, incandescent lighting, when compared with other lamps, has the lowest illumination output per electric bill dollar and it is more susceptible to damage by vibration (which is a factor to consider in platform lighting applications) and has a relatively short lamp life.

Mercury-vapor lamps are highly efficient light sources having about 2 to 3 times the life of an incandescent lamp. They do not have a filament and thus are not damaged by vibration. The color characteristics of the early mercury-vapor lamps were often objectionable. However, the new color-corrected lamps are more pleasing to the eye and they have gained considerable acceptance. The first cost of the installation is considerably higher than incandescent, Mercury lamps, because of the size of the light source, are difficult to control and yield only three IES light patterns. The mercury lamp also has a slow starting characteristic (4-8 minutes and sometimes longer) which in some cases may be objectionable.

Fluorescent lighting for use out doors is relatively new. It has a high illumination per watt output, low surface brightness causing less glare, and long life—somewhat above that of the mercury-vapor lamps. The first cost of the luminaire is higher than either the incandescent or the mercury vapor. Because of the large source, it is impractical to achieve any specific IES lighting pattern. Recently the VHO (very high output) fluorescent lamp was introduced. With the increased efficiency and high intensity of these lamps available the higher cost of the fluorescent installation may cease to be a significant factor.

It becomes obvious from the above that a cost study must be made for each lighting installation planned. All of the various factors must be considered and evaluated before any one type of lighting is chosen.

RR water for towns, cities

To what extent is it possible for railroads to utilize existing, but now little-used, water supply facilities in furnishing water to municipalities? What factors must be taken into consideration? Explain.

Advantageous practice

By W. F. Arksey
Engineer Water Service & Fuel Facilities
Great Northern
St. Paul, Minn.

A number of towns have acquired our facilities through negotiation and have converted them to their own use. Wells and reservoirs are probably the best asset the towns can acquire from a railroad. As a rule the water tanks are too low to fit into a municipal system without the use of booster pumps. Our deep-well turbine pumps are designed for too low discharge heads to be used.

One town was able to utilize our steel tank by moving it to high ground above town. Another plans on using our reservoir as a sewage disposal lagoon, while still another uses a reservoir as a recreational area in a territory where lakes are few and far between. Where the community is able to use our tank in its original location without interfering with railway operations, a long term lease on tank site and pipe lines is given. Such leases carry clauses placing responsibility for maintenance and final removal on the municipality. We do not allow tanks to remain close to main line tracks, however.

Where necessary, we have made arrangements to obtain emergency water should it ever be necessary. Terms of such agreements vary with local circumstances.

We feel that a number of small towns have been able to obtain water supplies beyond anything they could afford if it all were built at present-day prices. Where towns have water-treating plants the low railroad tanks

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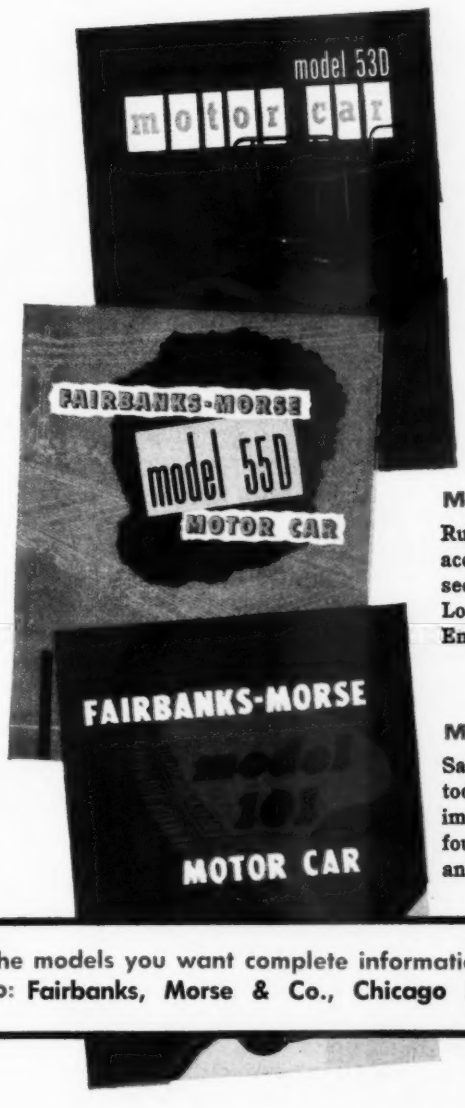

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can be used for raw water storage, providing a reserve in case of fire or other emergency.

Worth consideration

By L. P. DREW
Assistant Chief Engineer
Union Pacific
Omaha, Neb.

In many cases where locomotive watering facilities have been located in small towns or cities where the municipal supply is limited, it is often to the mutual advantage of both the railroad and the city to either donate or sell to the city for a nominal sum the locomotive watering facilities.

The railroad wells are usually larger in diameter and of greater capacity than many city wells. Also, the pumping facilities are usually more modern and better maintained; therefore, it is to the city's advantage to acquire these facilities.

In many states where water rights are essential for the appropriation of both underground and surface waters, the water rights held by the railroad usually are older and better established than those of the city. These water rights are of considerable value.

The water tanks are usually too low to offer much advantage to the city as the city pressure is higher than can be supplied by most railroad tanks.

With the retirement of locomotive watering facilities it is usually necessary to furnish a limited supply to the remaining railroad facilities such as section houses, stations, stockyards and for fire protection. These can be obtained from the city in exchange for the facilities turned over to the city by the railroad. Such transactions usually result in improved public relations between the railroad and the city and are therefore worth consideration.

Laying rail at night

To what extent is it practicable to lay rail at night when temperatures are relatively lower and traffic is lighter? What are the more serious objections to this practice? Explain.

Usually not advantageous

By W. E. CHAPMAN
Chief Engineer—Maintenance
Central of Georgia
Savannah, Ga.

Whether to lay rail at night when temperatures are relatively lower and traffic is lighter must be determined by local or special conditions at the time of laying rail.

It is necessary to lay rail at night sometimes due to local conditions, such as requirements by cities, counties, etc., where highway traffic during the daytime cannot be diverted and is very heavy or where suburban trains would prevent the laying of rail economically and in other similar conditions.

As a routine matter, the disadvantages of laying rail at night far outweigh the advantages, unless there is some special condition, where the working time at night is tremendously increased over the working time during the day.

In the southern part of the country rail is laid the year 'round and the weather conditions at night in the winter months would generally be intolerable. Even during the spring and fall there are nights that are too cold and wet for efficient work.

Other serious objections are listed below:

An expensive lighting system is needed for efficient laying of rail at night, and it is quite expensive to move parts of the lighting system along with the rail gangs. Even with the best of lights there is a loss of efficiency in night work, due to inevitable shadows.

Generally the carriers would have to pay a time and one-half rate for labor, or negotiate an agreement with the unions involved, as most agreements with the unions do not provide for changing working hours without penalty time. This alone would cause a tremendous increase in cost of laying rail, as the unions, particularly now, do not look with favor on changing agreements to allow night work without penalty time.

The hazards of personal injuries increase during night work, due to shadows that conceal holes, materials etc.

It is more difficult to keep up with small track material and check the proper installation of same.

There is increased difficulty in lining out old rail, lining in new rail, cribbing, adzing, gaging, spiking, and installing joints, tie plates and rail anchors.

Unless there is a tremendously large increase in productive time, and a good state of weather, or unless local conditions justify small amounts of laying at night, it is my opinon that laying rail at night is not practicable.

Normally impractical

By G. M. O'ROURKE
Assistant Engineer M/W
Illinois Central
Chicago

I would say that it is impracticable except in case of emergency.

Wherever traffic is sufficiently lighter at night to warrant consideration of the practicability of laying rail in the main track at night it is probably not prohibitively heavy during the regular working hours of daylight.

If traffic is extremely heavy at some period during the recognized working hours of daylight, it may be practicable to fleet trains or, on multiple-track districts, to detour trains around the work.

If fleeting and detour movements are ruled out, arrangements should be made to change the working hours to avoid heavy traffic periods, starting at dawn or stopping as darkness descends.

If the working agreement with M of W men will permit working at night it should also allow an early start in the morning or stop in the evening within daylight hours to avoid night work.

The more serious objections to the practice of laying rail at night are listed below:

(1) Increased cost. Unless mutual agreement is reached with the track-

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men by giving 36 hours' advance notice, or such other advance notice as the agreement may require on the railroad contemplating rail laying at night, penalty wages will be paid.

(2) Added expense of electric lights. To provide sufficient illumination for the work of each unit of a strung-out rail-laying gang moving at the fastest possible pace would be extremely difficult and expensive.

Every M/W officer of long experience has worked under lights at a derailment, washout or bridge burnout and knows how unsatisfactory it is and how everyone welcomed the dawn. To provide anything like sufficient illumination for laying rail in the darkness of night would be extremely difficult. An extraordinary number of generating plants would be required at unusually high operating and maintenance costs while being moved along in a production-line rail-laying gang.

Many rail-laying machines require a maximum of light and the least of shadow to get best results. Such are the various types of spike pullers and drivers and gaging machines. The vision of the operators must be given all of the help provided by daylight.

(3) Joints bars, tie plates, rail anchors, spikes and bolts could not be distributed in advance. They could not be found in the darkness unless very unusual and powerful lights are provided. Such small articles would, of necessity be brought along on push cars, if at all practical, at extraordinary expense.

(4) Imagine the difficulty of supervising the component parts of a large rail-laying gang separated into a number of small gangs working with a considerable distance between the extremes. Even under the best lights there would be loss of efficiency, adding to the cost.

(5) Safety hazards grow in number and acuteness at night. In laying rail men must move fast and the hazards of getting hurt by falling down in the darkness and other kinds of personal injuries are much greater at night. If everyone is sufficiently alert and careful to avoid all of the unseen pitfalls of night work there will be little accomplished.

No difficulty will be experienced with rail laid during daylight heat when proper expansion shims are used, or none at all if the temperature is very high. Heavy rail with high girder strength is being laid in daylight with frozen and welded joints. Sufficiently anchored it gives no trouble.

It is necessary to lay rail under lights in tunnels, subways and in tubes under rivers. Those are the only places where conditions are such that the added cost is justified.

I do not favor laying rail at night. On most railroads there are as many trains operating at night as there are during daylight hours.

Objections not too serious

By E. C. HONATH
Assistant Engineer
Santa Fe
Chicago

The advantages of laying rail at night to take advantage of lower temperatures or lighter traffic must be weighed very carefully when considering this type of operation for a specific rail relay location. In the past three years, the Santa Fe railroad has laid some 68 miles of continuous welded rail in the evening and night-time hours. The three locations that constitute this 68 miles were laid at night to avoid the interference of heavy passenger train movements. Although we have never laid rail at night to take advantage of the lower temperatures, the advantages are very apparent.

Our night rail-relay gangs require seven lighting units, most of which are powered by 2500-watt generators and furnish electricity for two banks of five 250-watt floodlights which shine forward and backward from the unit. These light plants are mounted on push cars and are shoved by hand as the work progresses. The cars that operate in the limits of the gang where one rail is removed are on rubber tires. The total additional cost for this special lighting equipment is estimated at about $6000.

Time studies indicate the first 1440-ft rail string laid at the beginning of work or after clearing for a train requires about 125 per cent additional time to complete laying than any of the successive strings laid. Using a normal 90-man rail gang as an example we have found that an average of 45 min more time is required for placing the first string than any of the following strings. So, for every train the gang clears, 67.5 man-hours of work is lost in addition to the 1.5 man-hours lost for every minute that expires from the time the gang closes up the track and the expected train passes.

To accommodate the movement of the light plants and other extra duties required due to the absence of natural light about 10 extra laborers are needed to supplement our normal rail gang organization. Assuming an eight-hour working day about 80 more man hours would be required for a night operation. This indicates that, any time it is necessary to clear two or more trains during the normal working hours, a time table should be studied to ascertain if a more economical relay can be accomplished with a night operation.

The physical advantages obtained when laying welded rail at a temperature closer to the mean temperature for the territory involved are obvious. Continuous welded rail has been laid at rail temperatures as high as 130 deg F. There have been certain maintenance problems experienced when laying in extreme temperatures; however, none of these difficulties has been so severe as to prohibit rail relays at almost any reasonable temperature.

Of course, the most economical and best method to assure the laying of welded rail at temperatures nearer the optimum is to plan your rail program to take advantage of favorable weather as much as possible. With an equivalent amount of train interruption a night rail relay would make labor cost about 11 per cent greater than the costs which would have been accumulated had the work been carried out in daylight. Therefore, night rail relays to take advantage of lower temperatures add considerable sums to the installation costs.

Although we should try to refrain from laying welded rail when rail temperatures are excessively high, certainly no night relay should be considered until daytime rail temperatures are over 50 degrees above the mean temperature for the area concerned. There is far greater danger in laying continuous welded rail at extremely low temperatures than at excessively high temperatures. We have experienced no greater number

(continued on page 54)

with WESTERN BUMPING POSTS

the ONLY Cost of Installation is TWO Man Hours

Why Pay 200% More for . . .

extra materials . . . extra operations?

CHECK THIS TABLE

Item	Other Brands	WESTERN
Extra Rail	Needed	NONE
Extra Spikes	Needed	NONE
Lay Extra Rail	Needed	NONE
Drill Holes in Track	Needed	NONE
Remove and Replace Section of Track	Needed	NONE

Unmatched Quality and Performance

The exclusive shoe castings on Western Bumping Posts clamp around the rails, performing a shock-absorbing function. When struck a severe blow, they slide or "roll with the punch" . . . only a few inches . . . dissipating the remaining force that usually breaks ordinary posts. More effective. Fewer parts to replace. Two men . . . one wrench. No other tools are needed because there are neither holes to drill nor other work to be done.

WRITE FOR BULLETIN NO. 1015

WESTERN RAILROAD SUPPLY COMPANY

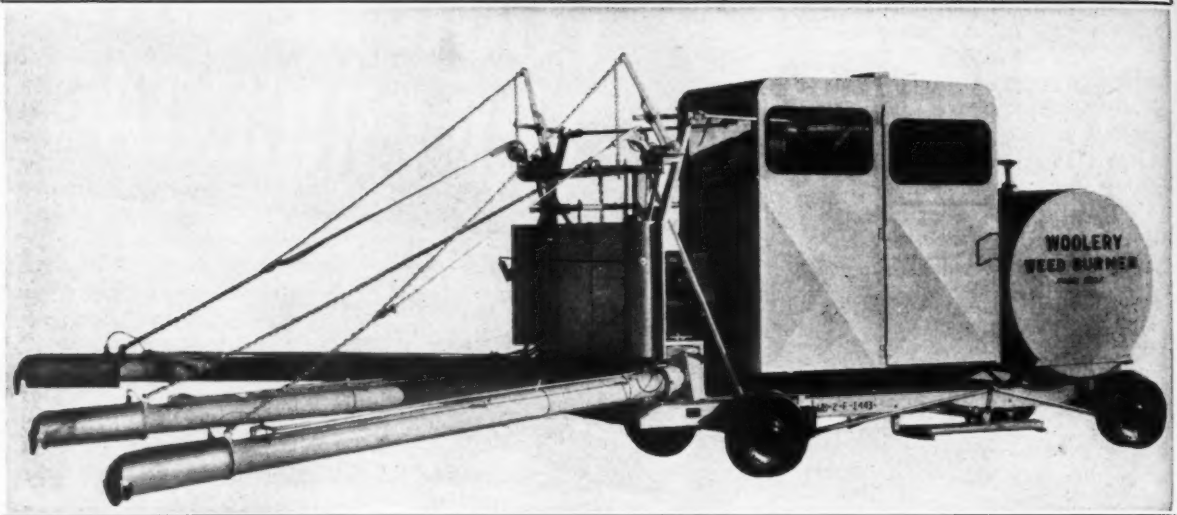
Division of Western Industries, Inc.

2400-2434 South Ashland Avenue, Chicago 8, Illinois

CANADA: Melville Machinery Co., Ltd., 515 Bisson Street, Montreal 3, Quebec

7127

NEW WOOLERY WB-2-F WEED BURNER IDEAL FOR MELTING SNOW IN SWITCHES



CONSTANT BLOWER SPEED maintains same heat intensity regardless of travel rate—an essential in yard work or snow-melting.
AUTOMATIC TRANSMISSION with torque converter. All steel cab with safety glass. Two entirely separate brake systems. Outside burners can be raised, lowered, swing in or out from inside the cab . . . self-propelled by 4-cylinder, water-cooled engine. MANY OTHER NEW FEATURES.

WOOLERY MACHINE COMPANY • 2919 Como Ave., S.E., Minneapolis 14, Minn.

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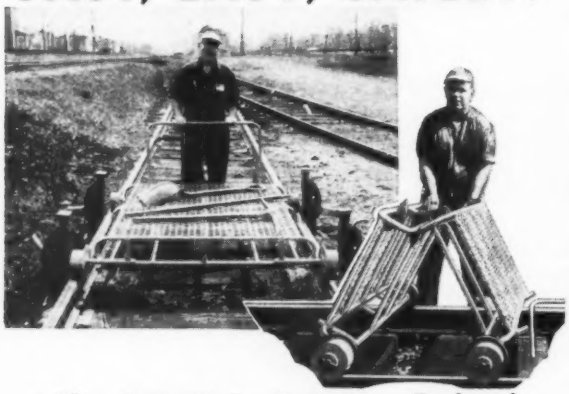

with the **NOLAN** Tool and Supply Car

Carries heavy loads of ties, rails, supplies, tools, etc.,—up to 2000 lbs. capacity. Strong all-tubular, high-carbon steel construction.

The car breaks conveniently in the center into two sections for easy handling and transportation. Easily and quickly unhooked or hooked together. Each section can be used for a truck seat.

The deck is heavy mesh-expanded steel, which prevents slippage of loads. Removable handle can be used at either end. Easily pushed on ball bearing cast steel wheels. All four wheels insulated. Platform size 48" x 45". Height above rail 8". Weight 140 lbs. complete — 70 lbs. per section. List $179.50. Order now!

Write for complete catalog of Nolan railroad equipment and supplies.

NOLAN

THE NOLAN COMPANY
166 Pennsylvania Street, BOWERSTON OHIO

REDUCE LABOR COSTS BY USING Q AND C ONE PIECE GUARD RAILS

The simplicity of design of Q and C Guard Rails made in one piece results in economy of labor of installation and maintenance as compared to Guard Rails with separate braces, plates, fillers, bolts and foot guards.

Q AND C

They are made of full manganese steel with wear resistance that assures long life under heavy traffic conditions. Specify Q and C Guard Rails on your requisitions.

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Serving Railroads For 71 Years

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right for rail joints

AREA Track Committee Photo

STANDARD Petrolatum HMP

(High Melting Point)

If you use STANDARD Petrolatum HMP for rail joint lubrication and corrosion protection you get some important benefits. Here are three:

1 Easier track maintenance.

2 Less chance of damage from joint freezing.

3 Longer rail joint life.

This is how STANDARD rail joint lubricants work to give you these benefits: Rail joint bolts are prevented from corroding. Nuts turn easily when joints have to be opened or tightened. Lubricant protects bolts from freezing and shearing in cold weather. Joint bars and rails are protected from wear, their service life is extended.

STANDARD Petrolatum HMP seals joints thoroughly and one application lasts years. The lubricant won't run off in hot weather or freeze up when it's cold. It is not affected by water washing or dissolved by brine dripping from refrigeration cars. It is easy to work with and apply.

Get more information about STANDARD Petrolatum HMP and other Standard Oil maintenance of way lubrication products. Write or call Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

Quick Facts About
STANDARD Petrolatum HMP

- Seals thoroughly
- Unaffected by high or low temperatures
- Won't water wash
- Not affected by brine dripping
- Penetrates and protects rail, joint bar, nut and bolt threads

STANDARD

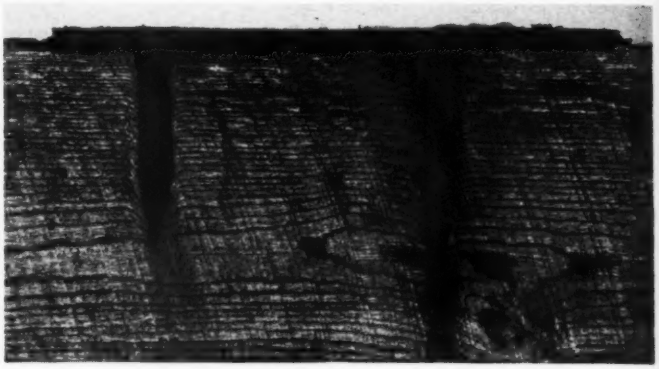
STANDARD OIL COMPANY
(Indiana)

Proof of the Seal

This Bird Self-Sealing Tie Pad is removed for inspection after 5 years of service. Because of its tenacious seal, the pad had to be pried from the tie with an adze. Bird Self-Sealing Tie Pads maintain dimensional stability . . . cannot stretch or compress . . . provide a *constant unbroken seal.*

Proof of the Protection

Unretouched photograph of cross section of tie shows underplate area, including spike holes, after 10 years' protection by Bird Self-Sealing Tie Pad. There is no trace of the destructive effects of moisture and abrasion in these vulnerable areas. *Moisture and abrasive materials could not penetrate the seal.*



Effective Tie Pad Performance Depends on the Seal...

and you get Proof of the Seal with BIRD Self-Sealing Tie Pads

The performance of tie pads depends on the permanent and effective seal between the pad and the tie. Any tie pad that is not securely sealed to the tie simply provides a shelter for accumulated moisture and abrasive materials. These destructive agents cause the breakdown of the supporting power of the tie under the plate and the holding power of the spike wood.

Bird Self-Sealing Tie Pads are the *only* tie pads whose durable and effective seal with the tie has been proved through years of in-track service. Actual in-track installation also proves that Bird Self-Sealing Tie Pads increase tie life sufficiently to pay the cost of tie pads many times over. These savings represent a substantial reduction in track maintenance costs.

In your '58 budget plans, be sure to allow for Bird Self-Sealing Tie Pads. For an interesting booklet giving facts and figures on dollar savings, write to Bird Tie Pads, East Walpole, Massachusetts, Department HTS.

Bird Self-Sealing Tie Pads Are Recommended For:

Bridge Decks • Curves • Switch Timbers
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Insulated Joints • With Smaller Tie Plates
Pile Cutoffs • Through Station Platforms
Out-of-Face Installations in Rail-Laying
Programs • Sandy Locations
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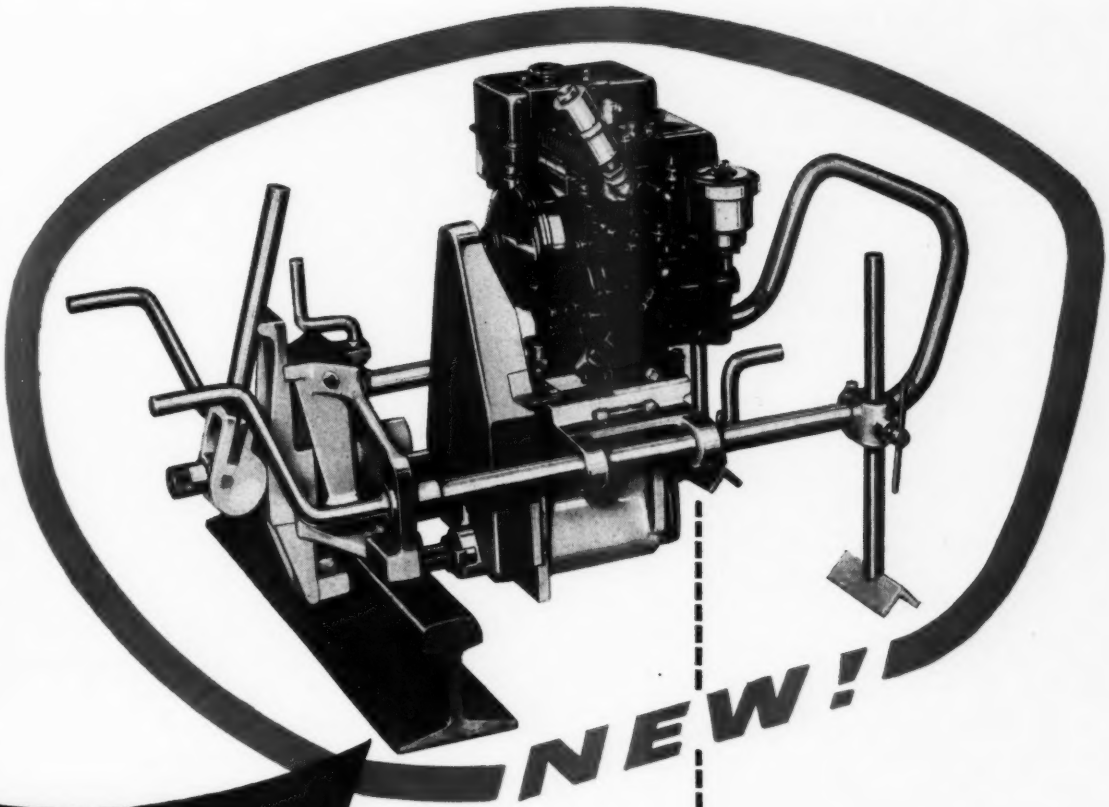
short or replacement costs are high.

Buy the Best... **BIRD & SON, inc.** *Established 1795* *Buy BIRD*



NEW!

RACINE® portable rail drill

WITH AUTOMATIC POWER FEED

Here is RACINE'S new Portable RAIL DRILL — completely new simplified design. A precision machine built for rugged in-track service. Once this machine is set up for specific rail size, it will drill hole after hole without further adjustment. Through an exclusive RACINE compensating pressure arrangement, feed of drill varies automatically, depending on sharpness of bit and hardness of rail.

★ **READILY PORTABLE**

Simple quick-acting cam actuated clamp holds machine in position and allows rapid removal of machine from track.

★ **EASY TO HANDLE**

Carrier guard protects mechanism and provides a convenient carrying handle for lifting machine. Weighs only 165 pounds.

★ **EASY TO OPERATE**

Clamping device automatically aligns machine. Drill is always properly positioned and securely held in place. Machine is leveled by two quick-acting ground contacts and spirit level.

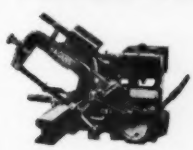
★ **POWERFUL, FAST**

Powered by easy-starting 2¾ H.P. four-cycle gasoline engine. Drives drill chuck at a 30 to 1 reduction providing more than adequate power.

★ **PRECISE, EFFICIENT**

Holes can be drilled cleanly and accurately through any rail web in less than two minutes. Quick acting drill holder provides easy drill changing. Drill holder is designed to utilize full length of drill shank.

OTHER RACINE PORTABLE RAIL TOOLS



RAIL SAW

Portable rail cropping machine—gas engine driven. Saves time—reduces rail failures.

UNIT TAMPER

Gas engine driven. Produces 1160 high velocity blows per minute. Weighs only 60 lbs.

HYDRA QUAD MULTIPLE TAMPER

Four tampers operated by one man. Hydraulically powered by 15 H.P. gas engine. Easy removal from track.

RACINE

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RACINE HYDRAULICS & MACHINERY, INC.

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of pull-aparts on continuous welded rail than on conventional jointed track. The most objectional feature of laying rail at higher temperatures is the adverse effect on ferrules in insulated joints, and the possibility of a pull-apart at an insulated joint. Even when laying rail within the higher temperature ranges, proper rail anchoring and sufficient ballast section will go a long way in preventing maintenance troubles originating from temperature changes.

This discussion hopes to show that it is both practical and economical to lay rail at night to evade excessive train delays and gang delays. It is also intended to show that night relays to take advantage of lower temperatures should be avoided unless absolutely necessary. Naturally, it is more desirable to lay rail in daylight when possible; however, there are no excessively serious objections to this night relay practice. A proper unloading of rail and fastenings and the use of a rail gang that has been organized on a daylight relay eliminate many of the problems. It is also desirous to have the gang start work before sunset if possible. We have found that this is the time when natural light is most needed.

Sighting back when raising

When raising track to a spotboard and with jacks set at the joints and centers, some foremen sight backward for pulling jacks set at the quarters. Are there advantages in this practice? Disadvantages? Explain.

Not very successful

By W. T. FULLER
Roadmaster
Milwaukee Road
Milbank, S.D.

I tried this practice several times but it did not work out very successfully especially where we had a large gang. The man sighting the spot board could not keep up when he tried spotting the other jacks behind him. Either the head jacks or the spotting jacks were idle too much of the time.

I used one man sighting the spot and one man with the jacks behind raising out the low spots.

Where we had smaller gangs and used the old hand operated tampers this method worked out good but with the machines we have now to do the tamping, one man has all he can do to keep ahead with the spot board.

Back sighting important

By M. R. MIECH
Track Supervisor
Chicago, Burlington & Quincy
Sheridan, Wyo.

To sight backward to raise low quarters is, in my opinion, of utmost importance. It is as important to maintain a uniform quarter as it is the rest of the rail. The entire rail should be raised as uniformly as possible. A low quarter will become deeper and longer and, if left too long unraised, it will become surface bent. Some of the rough track is caused from low quarters which were left unraised.

This all adds up to the fact that the cost of maintenance will be greater if correct maintenance is not exercised in the beginning.

Advantage to back-sighting

By O. A. LUTON
General Track Foreman
Southern Pacific
Citrus Heights, Calif.

There are various opinions covering the subject of surfacing track where a spotboard is used with or without grade stakes or when sighting by eye. Regardless of what method is being used to raise track—with jacks set at joints and centers, or about ten ties apart — in my opinion, there is an advantage in sighting backwards to acquire a smooth surface. This is true even though with jacks set at joints, there is more spotting ahead of tamping than with jacks set about ten ties apart. The greater the distance between jacks—the greater the chances are that the rail will not come up to a smooth surface because of the weight of the ties, tie plates, spikes, creepers, and, no doubt, the weight of the foreman and a few men on the ties. This constitutes a considerable weight that can well cause the rail to sag between the jacks. If the jacks were set ten ties apart, the track would have less tendency to sag between raises.

Each track-surfacing operation is different—the rail may be different, ballast sections will differ, all foremen are not alike, and hot or cold weather will make a difference, hence, the difference in opinion. To acquire a smooth surface, the man with a trained eye will keep his eye on the rail and sight backwards in the direction of the freshly surfaced track and thus smooth out any irregularities before the ties are tamped.

Certainly an advantage

By E. V. GROGAN
Supervisor of Track
New York Central
Brewster, N. Y.

Where jacks are set at the joints and centers there certainly is an advantage in sighting backward to determine if there are low quarters. This would of course be particularly true where 39-ft rail or longer is used. When raising track out of face there are bound to be some low spots. To pass over these without bringing them up to proper surface ahead of tampers would only be inviting trouble.

The fact there is a low quarter is an indication that there has been a weakness due to various conditions such as unstable roadbed, poor drainage, etc. In raising track, as doing any type of track work, the aim should be to permanently cure the weaknesses. Not only should these quarters be brought to proper surface but it may be desirable in some cases to make an extra insertion by power tampers at these locations so we may be sure we have eliminated the cause.

On the New York Central we have experimented, with considerable success, in setting jacks at and tamping every eighth tie on a 39-ft rail to

(continued on page 60)

Another off-track use for a D8

Daylighting a tunnel on the Northern Pacific Railway

A CAT* D8 Tractor equipped with a No. 8U Bulldozer recently went to work for the Northern Pacific Railway, daylighting Tunnel 7, a few miles east of Superior, Montana. Morrison-Knudsen Co., Boise, Idaho, was the contractor.

The big, versatile Caterpillar D8 Tractor had a number of assignments on the job, which called for the removal of about 59,000 cubic yards of shale rock. First it constructed access trails along the steep slopes beside the tunnel so drilling equipment could be hauled in. It also dozed dirt into the tunnel to form a cushion around the ties to protect them from construction equipment. Throughout the entire job it maintained access roads and kept this important freight line clear. During rock removal operations, the D8 spread waste rock below the railroad grade for 400 feet on each side of the tunnel.

It takes dependable, all-around equipment such as the D8 to do all these vital jobs and keep work on schedule. Its 191 HP (flywheel) diesel engine can be teamed with a torque converter or with the exclusive Caterpillar oil clutch. Seven-roller track frame and "water quench" hardened track shoes give added work life. Highly effective filters and seals keep wear-causing abrasives out of all moving parts.

Your Caterpillar Dealer has a complete line of dependable crawlers ranging from the dependable 48 HP (flywheel) D2 to the mighty 320 HP (flywheel) D9. They have been designed to save you maintenance costs just as the Cat Dealer will save you capital investment by stocking an entire inventory of parts. Call him today for a demonstration on *your* job. You name the date . . . he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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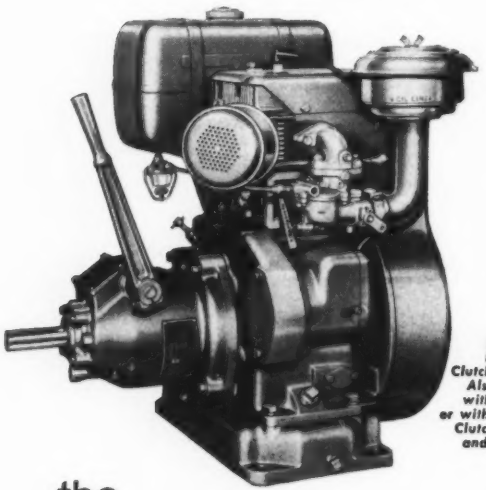

Model AGN Engine with Clutch Assembly. Also available with stub shaft or with Reduction, Clutch Reduction and/or Electric Starting.

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Putting 12½ hp. into a single cylinder air-cooled engine calls for basic *High Torque*...the *load-holding Lugging Power* that keeps the equipment *working* through sudden shock loads. It also calls for heavy-duty construction in all details . . . plus dependable cooling under all weather conditions from sub-zero to 140° F. (60° C.).

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ROBERT G. LEWIS, Publisher

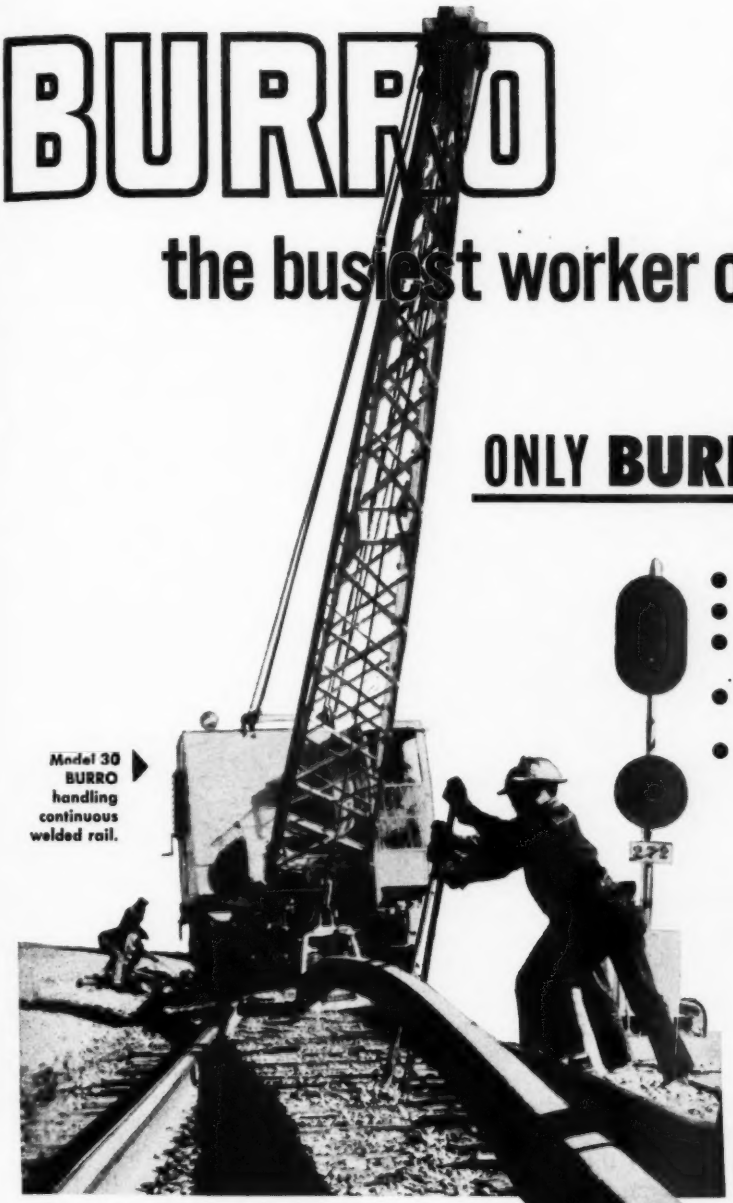
Sworn to and subscribed before me this 30th day of September, 1957.

(Seal) EDMUND J. PUYDAK

(My commission expires March 30, 1959)

BURRO

the busiest worker on the track



Model 30 BURRO handling continuous welded rail.

ONLY BURRO CRANES HAVE ALL THESE ADVANTAGES:

- Fast travel speeds . . . up to 28 MPH
- Draw bar pull in excess of 9000 lbs.
- Elevated Boom Heels for working over high sided gondolas
- Short tail swing—will not foul adjoining track
- Low overall height. BURRO can be loaded and worked on a standard flatcar.

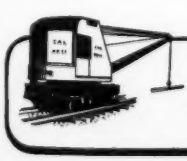
Model 30 BURRO stockpiling rail at welding site.

New track construction with a Model 30 BURRO is a fast, efficient operation.

Trackwork—a BURRO Crane specialty, is just one of countless jobs these fast, powerful workhorse units are doing on the railroad today.

Pound for pound, there's more work power and versatility built into BURRO Cranes than any other unit. A BURRO takes any job in stride. In the yard or on the line, it is unequalled for speed and economical performance.

BURRO Cranes are made in three models—Model 15A, Model 30, and the larger Model 40. BURRO Crane catalogs have the full story on these time and money-saving machines. Write for them.



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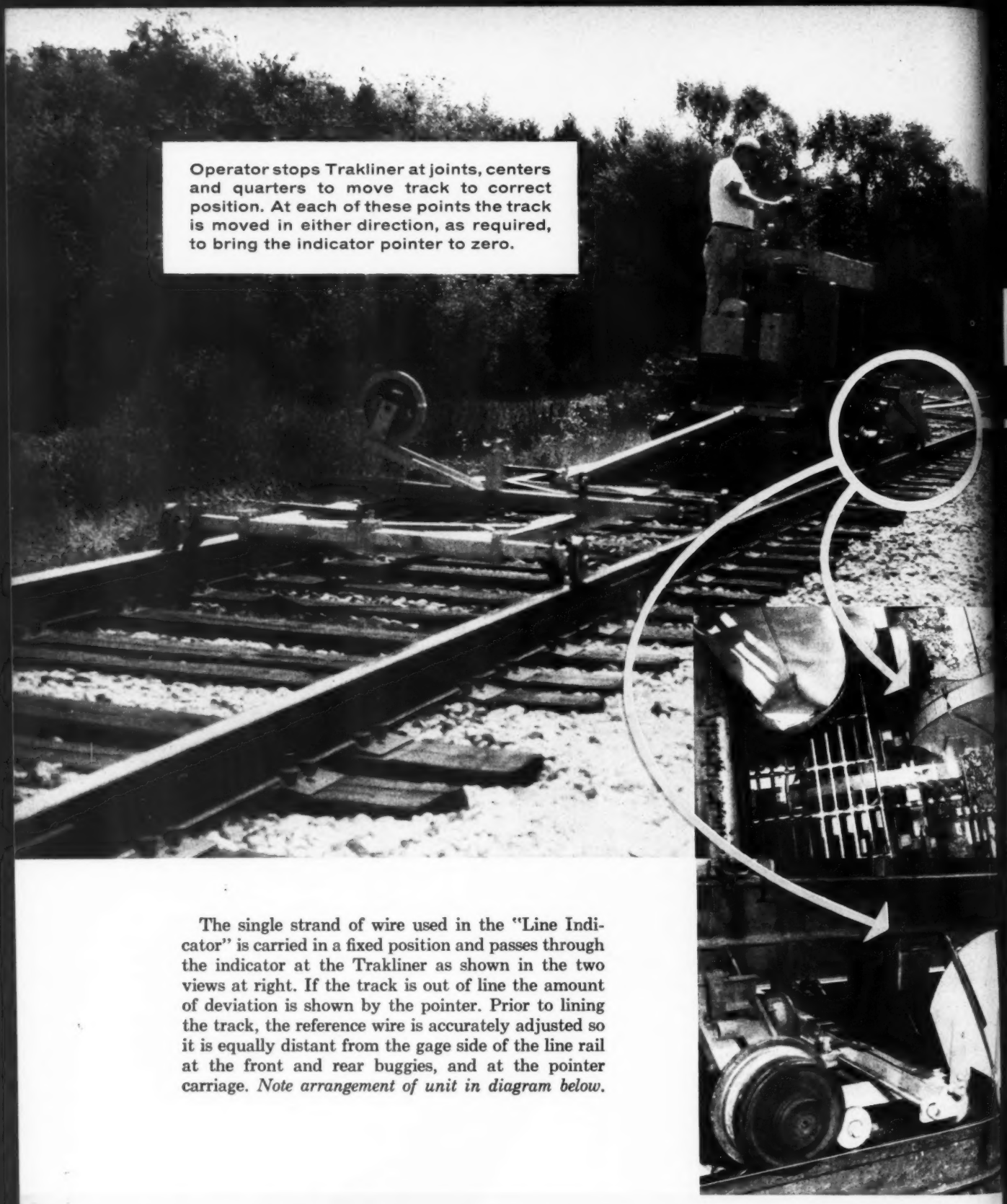
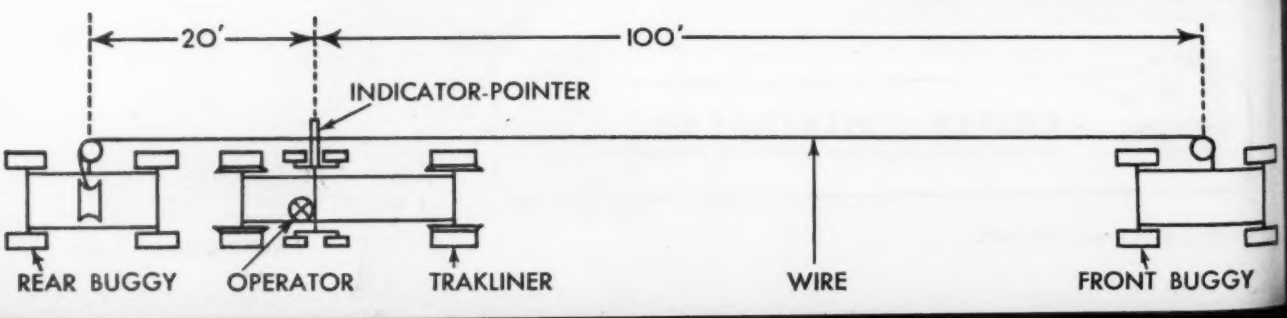


Operator stops Trakliner at joints, centers and quarters to move track to correct position. At each of these points the track is moved in either direction, as required, to bring the indicator pointer to zero.

The single strand of wire used in the "Line Indicator" is carried in a fixed position and passes through the indicator at the Trakliner as shown in the two views at right. If the track is out of line the amount of deviation is shown by the pointer. Prior to lining the track, the reference wire is accurately adjusted so it is equally distant from the gage side of the line rail at the front and rear buggies, and at the pointer carriage. *Note arrangement of unit in diagram below.*



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THE NEW

NORDBERG "LINE INDICATOR"

. . . LATEST *Mechanical Muscle* QUICKLY LINES BOTH TANGENT TRACK AND CURVES

Quick, lower cost lining of curves and tangent track is now possible with the new Nordberg *Line Indicator.* Using the well-known Trakliner® as a central unit, this new "Mechanical Muscle" does the complete job of sighting and lining track.

Sighting is accomplished with a 120-ft. length of wire. This wire is mounted on a moving assembly consisting of two 4-wheeled buggies which are maintained at proper distance from the Trakliner by coupled lengths of aluminum tubing. One of the end buggies of the *Line Indicator* is located 100′ ahead of the Trakliner and the other 20′ behind it. An indicator, mounted on a small carriage, is placed directly beneath the Trakliner in full view of the operator. If the track is out of line in relation to the reference wire, the amount of deviation is shown by a pointer on the indicator. The Trakliner then makes the correction.

Under average conditions, the Nordberg *Line Indicator* and Trakliner will line a rail length of tangent track in two minutes. In lining curves, two "passes" around the curve are made. The first, to obtain original "ordinates" and the second, to line to the desired final ordinates. A recently ballasted, one-degree curve, 4900 feet long, was lined by this method in only four hours.

A Trakliner operator and a man to adjust the pointer scale are all the crew that is required . . . together they can easily remove the light-weight buggies and tubular sections, as well as the Trakliner, from the track.

The *Line Indicator,* like all Nordberg equipment, was developed in the interest of and with the cooperation of the railroads to provide fast, safe, economical track maintenance. *Write for further details.*

Cost-Cutting Nordberg "Mechanical Muscles"® include:

BALLAST ROUTER · BANTAM RAIL SLOTTER · CRIBEX® · BALLASTEX® · SCREENEX® · SPIKE HAMMER · TIE DRILL · HYDRAULIC and MECHANICAL SPIKE PULLERS · POWER JACK · POWER WRENCH · RAIL DRILL · RAIL GRINDERS · SURF-RAIL® GRINDER · TIE-KAT® · TRACKSHIFTER · DUN-RITE® GAGING MACHINE and BRONCO · DSL® YARD CLEANER · GANDY®—TIE PULLER and INSERTER · GANG TAMPER · SELF-PROPELLED ADZER · SELF-PROPELLED SPIKE PULLER · TAMPING POWER JACK · TRAK-SURFACER.

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Milwaukee, Wisconsin

NORDBERG *Mechanical Muscles®*

eliminate the low quarters generally found when jacks are set at the joints and centers. Where power jacks with tampers attached are used, this same practice is followed tamping every eighth tie ahead of power tampers.

There is, perhaps, too much tendency where considerable mechanical equipment is being used to overlook low quarters ahead of tamping equipment. This may be considered minor, but, if allowed to remain, these locations will later become major trouble spots.

Has certain advantages

By D. R. ROGERS
General Foreman
Great Northern
Saco, Mont.

This practice has certain advantages providing the proper procedure is used, sufficient jacks are on hand and rail conditions are such that benefit can be derived from this method. These are:

(1) Not less than five jacks should be used per side on joints and centers. This allows the foreman two and one-half rails of raised track to spot back on and pull up the hanging quarters to proper height. With less than five jacks per side, a foreman does not have sufficient raised track to gage his lift at the quarters by. Also, a level board should be used on pulling quarters as improper crosslevel can develop if this procedure is not followed.

(2) Rail that is badly surface bent can be raised with best results by using this method, inasmuch as the foreman will not have the quarters hump up on him as is usually the case when placing jacks every eight ties as is the standard practice on most roads. The disadvantages of this method are:

(1) In new rail or rail in good condition, a certain amount of time is lost by having to go back and pull up the quarters. With the eight-tie method, all the work is carried out ahead of the foreman. With the jacks moving in rotation to the front, the work progresses in an organized manner. On lifts of 4 in and under, low spots seldom occur using the eight-tie method on the quarters which require pulling up. Such lifts do not warrant the use of the joint and center method to any advantage.

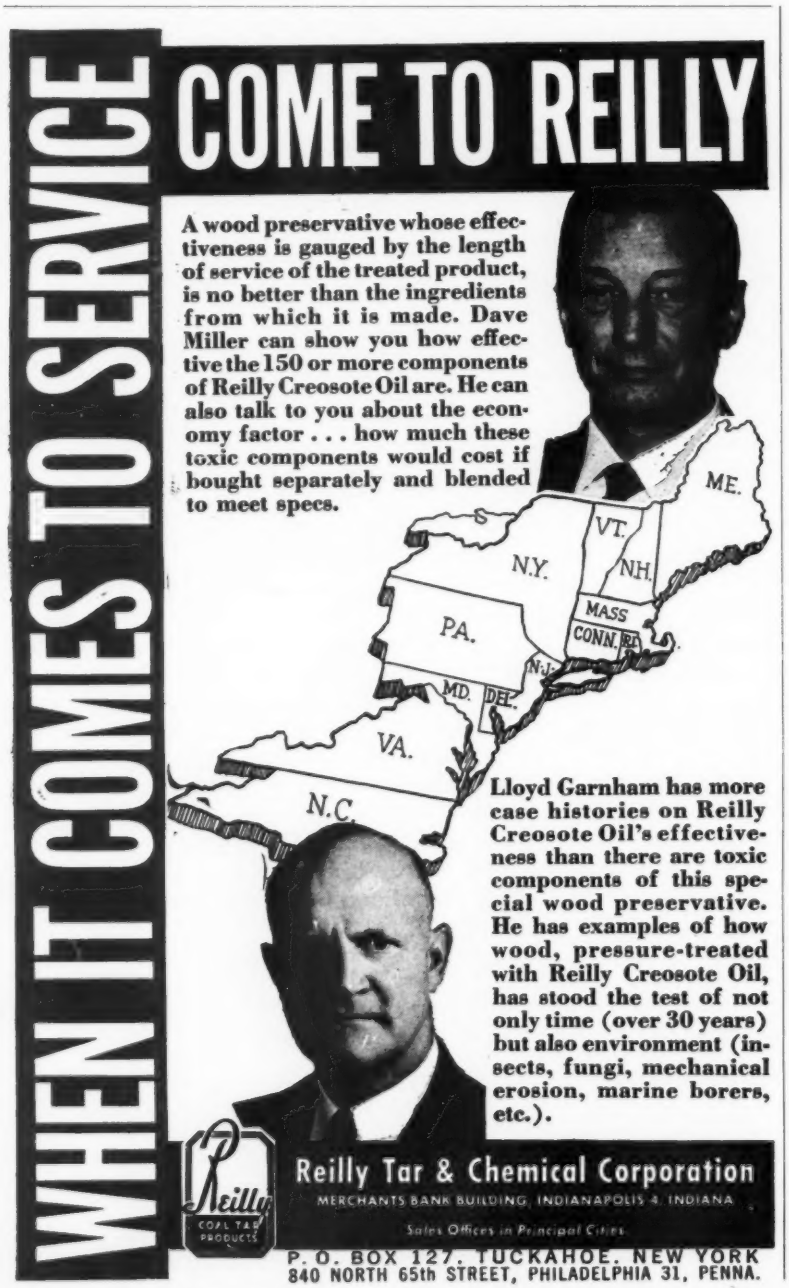
On badly surface-bent rail, the eight-tie method loses some of its advantages due to poor surface.

Disadvantageous as a whole

By O. C. PREWITT
Roadmaster
Texas & Pacific
Marshall, Tex.

As a whole, it is a disadvantage. Several times it has been noticed that a foreman, sighting backward over track that he has surfaced, has had jacks set in quarters where men had already caught off. It also works a hardship on the foremen doing the sighting of the rail for it means running back and forth when changing positions for sighting. It is an invitation to pull track without using a cross-level.

I have found it profitable to use four jacks and, on the line rail, pull the joint to the spotboard and sight out the center.


WHEN IT COMES TO SERVICE
COME TO REILLY
A wood preservative whose effectiveness is gauged by the length of service of the treated product, is no better than the ingredients from which it is made. Dave Miller can show you how effective the 150 or more components of Reilly Creosote Oil are. He can also talk to you about the economy factor . . . how much these toxic components would cost if bought separately and blended to meet specs.
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Lloyd Garnham has more case histories on Reilly Creosote Oil's effectiveness than there are toxic components of this special wood preservative. He has examples of how wood, pressure-treated with Reilly Creosote Oil, has stood the test of not only time (over 30 years) but also environment (insects, fungi, mechanical erosion, marine borers, etc.).
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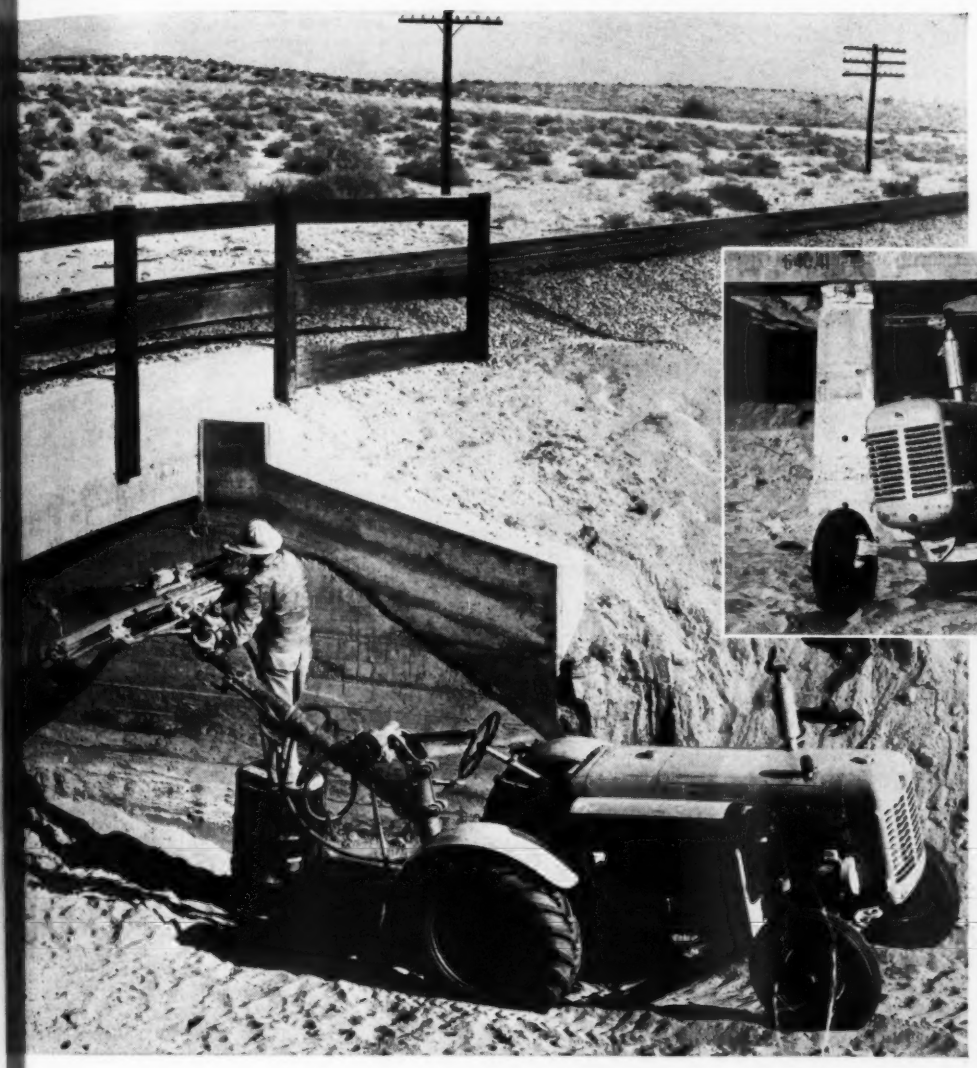


This self-propelled Le Roi Tractair with Mobildrill attachment is altering hundreds of railroad bridge structures in the Salton Sea desert area of the Southwest. The bridge structure changes will permit the installation of a new train control system along a 200 mile area of the Southern Pacific railroad.

The Tractair Mobildrill attachment can be positioned in a wide range of angles for all kinds of drilling. The air-fed Mobildrill makes drilling quick and easy for the operator. On this job, contractors take advantage of the Tractair's versatility and mobility to reach work sites out on the desert sands.

How Railroad Uses Tractor-Compressor to Lick 200-mile Job in Desert Sands

Drilling rig mounted on combination unit, speeds from one working location to another.

Le Roi Tractair mobility not hindered by the dry, loose sand.

On the job, Mobildrill swings easy, gets into tight corners, saving hours in weekly drilling time.

Shifting sands of the desert pile up some equipment problems on the new train-control system project now under way between Colton, California and Yuma, Arizona.

The T. M. Page Corp., subcontractor on the 200-mile project says, "We found an answer in the Le Roi Tractair. It's one machine able to crawl through this very loose, dry sand under its own power. It's versatile. Most of the other machines need a crawler tractor to get them in and out of the work sites."

The Tractair with its air-fed Le Roi-Cleveland Mobildrill attachment is drilling hundreds of concrete supports for alteration of bridge structures. The Mobildrill makes drilling easy for the operator, as it can be swung to a variety of angles for all kinds of drilling.

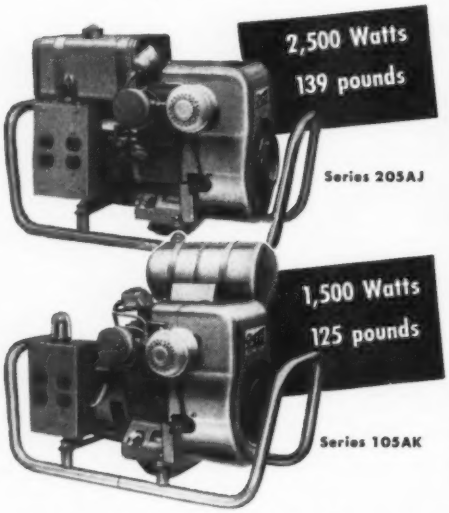
Because Tractair is a combination 125-cfm air compressor and a 42-hp wheel tractor in one self-contained unit, it can be equipped with a wide variety of attachments. These include a front-end loader or a backhoe, plus dozens of accessories and air tools for most any need.

Three other Le Roi compressors are used on the project. "Perfect" service for all four Le Roi machines is provided by the distributor, according to the contractors. All of the Le Roi units work 8 to 9 hours each day in the hot climate.

T-52

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

YOU GET *4-cycle* DEPENDABILITY
AND *Light weight* TOO . . . IN AN



ONAN Electric Plant

These power-packed electric plants give you all the *4-cycle* advantages of quick starting, long life and trouble-free operation . . . with an amazing weight saving over usual 4-cycle plants. You can carry them easily to any spot . . . and you can count on them delivering their full rated capacity as long as you need it. Both are single-cylinder, air-cooled . . . completely equipped and ready to go.

Other models to 75,000 watts.

Write for special folder on lightweight models!

D. W. ONAN & SONS INC.

Onan ELECTRIC PLANTS

3923 University Ave. S. E., Minneapolis 14, Minnesota

NOW GRAVELY Gives You Push Button Snow Removal!!

New Gravely Self Starter . . . Choice of 3 Snow Removal Tools!

A new experience in snow removal—simply push the button and your Gravely Tractor is ready for the toughest snow removal job! . . . The only 5-HP Tractor offering a choice of Snowblower, Snowplow or Power Brush for snow removal—choose the tool to fit your particular job. New Steering Sulky also available. Too, this one tractor offers 30 attachments to choose from for year-'round grounds maintenance tasks. From 75" gang mowers to 48" Snowplow, the Gravely saves time and money all year!

GRAVELY TRACTORS, INC., Box 42, Dunbar, W. Va.

Biographical briefs (cont'd.)

School of Mines and joined the NYC in February 1948 as a rodman at Detroit, Mich. After serving as transitman at Detroit, he was named instrumentman at Jackson in July 1950, which position he held until June 1956 when he was promoted to assistant supervisor of track at Englewood, Ill.—the position he held at the time of his recent promotion.

S. G. Phillips, who was recently named vice-president—engineering of the Boston & Maine at Boston, Mass. (*RT&S,* October, p. 26), graduated from the University of Maine in 1917 and began railroading that same year with the Lehigh Valley. In 1929, he joined the Central of New Jersey and, later that same year, entered the service of the B&M. In 1942 he joined the Maine Central and Portland Terminal Company and from February 1949 until he received his recent promotion he served as chief engineer of the B&M with headquarters at Boston.

John F. Carney, who was recently named district supervisor—budget and statistics on the New York Central at Syracuse, N. Y. (*RT&S,* Sept., p. 26), was born at Boston, Mass., October 24, 1929, and attended Northeastern University. He began railroading with the NYC in October 1952 as a laborer at Allston, Mass., and subsequently served at Allston and Boston as timekeeper, clerk and assistant chief clerk. He was holding the latter position at the time of his recent promotion.

Fred G. Schurman, 41 who was recently promoted to division engineer on the Union Pacific at Los Angeles, Cal., (*RT&S,* Sept., p. 26), graduated with a bachelors degree in civil engineering from Purdue University in 1938 and began railroading with the UP in 1942 as an instrumentman. After serving as a major in the U.S. Army Transportation Corps in World War II, he returned to the UP in 1946 to serve as assistant engineer on the Nebraska division. From September 1948 until October 1950, he was chief engineer of the Saudi Government Railroad in Saudi Arabia. On the latter date he returned to the UP to serve as assistant engineer on the Nebraska division and in the office of the chief engineer at Omaha. He was serving in the latter capacity at the time of his recent promotion.

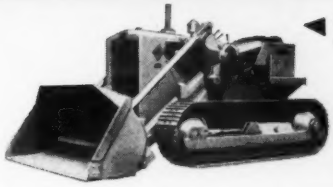
John S. Knight, whose retirement as regional engineer of the Baltimore & Ohio at Chicago, was recently announced (*RT&S,* May, p.32), graduated from Ohio State University and joined the B&O in June 1910 as a rodman at Chicago. He served subsequently as levelman, transitman, draftsman, assistant division engineer, and accounting engineer until 1924 when he was promoted to office engineer at Chicago. The following year he was named principal assistant engineer, which position he held until 1945 when he was promoted to assistant regional engineer at Chicago. He was named regional engineer in 1949.

Allis-Chalmers crawler tractors are engineered to give you high output, easy handling, and low-cost performance. Four sizes from 52 drawbar to 225 net engine horsepower. Wide range of attachments for each model.

CHOOSE MODERN MACHINES FOR MODERN OFF-TRACK METHODS

You'll find just the machine you need for today's off-track methods in Allis-Chalmers' complete line of advanced-design construction machinery—a right type and size for every application. Each machine offers performance and maintenance features that save time and improve operations on a wide range of construction, maintenance, and material handling jobs.

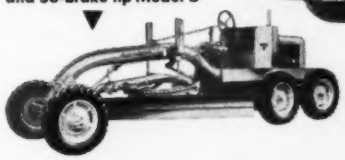
See your Allis-Chalmers dealer . . . let his railroad representative help you select the right machine from this modern line. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



4 Tractor Shovels—1½ to 4-cu yd standard buckets

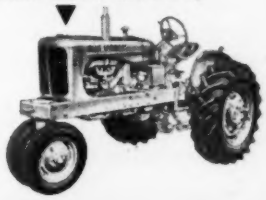
3 Motor Scrapers — 9.5, 14 and 20 cu yd (heaped)
2 Motor Wagons — 15-cu yd rock and 22-cu yd bottom dump (heaped)
4 Pull-Type Scrapers — 4.7 to 20 cu yd (heaped)

2 Motor Graders—120-brake hp Model Forty Five and 50-brake hp Model D

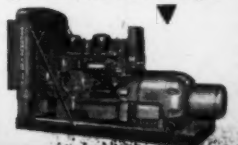


Fork Lift Trucks—Capacities 2,000 to 10,000 lb diesel, LP gas or gasoline—attachments to fit the job

3 Wheel Tractors with Attachments—22.8 to 45.3 belt hp



Engines and Generating Sets—Type for any power need, 9 to 516 hp, diesel, gasoline, natural and LP gas



ALLIS-CHALMERS *Engineering in Action*

Biographical briefs (cont'd)

L. Reid Henderson, 41, who was recently promoted to assistant division engineer of the Erie at Youngstown, Ohio (*RT&S,* June, p. 24), graduated from the University of Michigan and joined the Erie in 1937 as a trackman and signal helper. He served subsequently as rodman, transitman, general track foreman, and track supervisor at various locations until he received his recent promotion.

Ralph D. Jackson, 32, recently promoted to supervisor of track on the Illinois Central at Mendenhall, Miss. (*RT&S,* Apr., p. 78), graduated from Mississippi State College in 1950 and joined the IC as a rodman in November 1953. He was promoted to assistant supervisor of track in September 1955—the position he held at the time of his recent promotion.

R. G. Garland, 38, who was recently named acting roadmaster on the Santa Fe at Oceanside, Cal. (*RT&S,* June, p. 24), graduated from the University of Arkansas and Texas Tech and joined the Santa Fe at Clovis, N. M., in 1941. After serving in various positions on the road's western lines, he was transferred to Chicago as a draftsman on the chief engineer's staff. He was promoted to assistant engineer on January 1, 1952—the position he held at the time of his most recent promotion.

TIE PLATE LOCK SPIKES . . . GAGE LOCK SPIKES

Hold Gage—Extend Tie Life

Reduce Maintenance

Tie Plate Lock Spike

Gage Lock Spikes in Track

Gage Lock Spike

TIE PLATE LOCK SPIKES hold tie plates firmly in place on cross-ties and bridge timbers. They are quickly and easily driven or removed with standard track tools. Driven to refusal, the spread shank is compressed by the walls of the hole. Plates are held against movement under spring pressure. Play between spike and hole is eliminated—gage is held and plate cutting is overcome.

The GAGE LOCK SPIKE is a rail spike, as well as a plate fastening, for use on tangent track and light curves where lateral thrust can be overcome with only two spikes at each plate rather than four cut spikes. It possesses the same features and advantages as the Tie Plate Lock Spike. The Gage spike is offset at the tie plate surface to avoid thrust and wear from the edge of the rail base. The use of Gage spikes saves up to 13,000 spikes per mile and potential damage to the tie from spiking and splitting is drastically reduced.

BERNUTH, LEMBCKE CO., INC.

420 Lexington Avenue, New York 17, N. Y.

Wm. B. Jackson
CNR

P. O. Ferris
D & H

William B. Jackson, who was recently appointed general superintendent on the Canadian National at North Bay, Ont. (*RT&S,* Sept., p. 26), was educated at the University of British Columbia and the University of Alberta, and joined the railroad in 1945 as an instrumentman at Montreal. In 1946 he was named assistant engineer at Montreal and, two years later, was named assistant division engineer at Levis, Que. He was appointed division engineer at Cochrane, Ont., in 1950 and in 1953 was transferred to London, Ont. In 1955 he was promoted to district engineer at Toronto—the position he held at the time of his recent promotion.

P. O. Ferris, 65, who recently retired as chief engineer of the Delaware & Hudson (*RT&S,* Aug., p. 12), graduated from the Renssealer Polytechnic Institute, and joined the D&H in July 1917 as a rodman at Albany, N. Y. He served, subsequently, as senior transitman, assistant roadmaster, track supervisor, roadmaster, assistant engineer maintenance of way at Albany, division engineer at Oneonta, acting engineer maintenance of way at Albany, and engineer mainteance of way at Albany, until July 1939, when he was named chief engineer. In August 1949, he was named assistant general manager and chief engineer which position he held until March 1955 when that title was abolished and he retained the title of chief engineer.

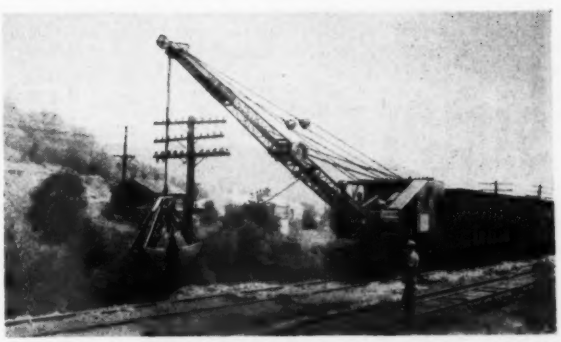
James G. Watwood, 25, who was recently named superintendent of structures and materials on the Central of Georgia (*RT&S,* Sept., p. 26), graduated from the Alabama Polytechnic Institute and joined the C of Ga in June 1956. Prior to joining the railroad he had served with the Batson & Cook Contracting Company, the U. S. Air Force, and the Alabama Polytechnic Institute where he was an instructor in mechanical engineering.

Paul R. Matthews, 48, who was recently promoted to division engineer on the Chesapeake & Ohio at Richmond, Va. (*RT&S,* Aug., p. 12), graduated from Ohio State University and began railroading in 1925 with the Hocking Valley at Columbus, Ohio. Until 1932 he served the HV and C&O in various capacities in the engineering and maintenance departments. In 1935 he was named carpenter helper on the C&O at Columbus, Ohio, subsequently serving as rodman, draftsman at Richmond, assistant cost engineer at Clifton Forge and Marion, Ohio, as-

In the aftermath of an Eastern hurricane, 7 Koehring self-propelled RailAids were rushed into the disaster area. Pictures show how they speeded track clean-up, salvage and repair to quickly re-establish main-line service.

Repairing HURRICANE FLOOD DAMAGE

Cargo salvage — Shipments had to be rescued in a hurry. RailAid crane removed bales of unprocessed wool from wrecked box cars, transferred them into gondola cars, and, later, into trailer trucks. By this quick action delivery was completed without spoilage.



Washouts and landslides knocked out 500-foot sections of track in some places. Here, a Koehring 205 working on its own rail-propulsion car fills ballast along a weakened double-track section. Another RaidAid is working off-track behind the gondola cars.

Ties, rails, drainage pipe were quickly reclaimed, and put back into use. RailAids loaded ties on ballast boxes, moved on-track, towing rails, materials and supplies, re-laid rail — worked round-the-clock to open main line for regular service in record time.

On and off-track flexibility was an important factor in the disaster clean-up. Where track was blocked, RailAids took to high ground, worked and traveled off-car. Read all about it in the latest RailAid bulletin. Write to **Koehring Co., Milwaukee 16, Wis.**

K659

KOEHRING RailAid® Subsidiaries: PARSONS EWIK-MIX • JOHNSON

Biographical briefs (cont'd)

sistant supervisor of track at Marion, and supervisor of track at Columbus. In 1948 he was promoted to assistant division engineer at Ashland, Ky., which position he held at the time of his recent promotion.

T. D. Livingston, 40, whose promotion to division engineer on the Chicago, Burlington & Quincy was recently announced (*RT&S*, Sept., p. 26), joined the CB&Q in May 1942 as a rodman. After serving as rodman and instrumentman at various locations, he was named senior instrumentman in January 1950—the position he held prior to his promotion to division engineer at Alliance, Neb.

Walter D. Rhoads, 69, whose retirement as division engineer of the Central of Georgia at Macon, Ga., was recently announced (*RT&S*, Sept., p. 26), attended Bucknell University and joined the C of Ga in June 1923 as a draftsman at Savannah. He served subsequently, as assistant engineer at Savannah and Columbus, track supervisor at Macon, roadmaster at Columbus and supervisor of bridges and buildings at Macon until September 1939 when he was named division engineer at Macon.

R. P. Johnson, 57, who was recently named assistant superintendent, structures and material, of the Central of Georgia at Macon, Ga. (*RT&S*, Sept., p. 26), began his railroad career in 1915 with the Alabama, Tennessee & Northern. After serving as bridge foreman with the AT&N he joined the Meridian & Bigbee in 1936 as roadmaster, which position he held until 1944 when he joined the C of Ga as iron bridge gang foreman—the position he held at the time of his recent promotion.

M. D. Carothers, 71, who recently retired as assistant chief engineer of the Gulf, Mobile & Ohio at Bloomington, Ill. (*RT&S*, Aug., p. 12), graduated from the Marietta Academy and College in 1908 and began railroading with the B&O in June 1909 as an instrumentman at Philadelphia, Pa. In 1912 he was named efficiency engineer of track on the Chicago division and in 1914 was appointed assistant supervisor at Havre de Grace, Md. The following year he was named supervisor at North Vernon, Ind., and in 1917 was promoted to assistant division engineer at Dayton, Ohio. In 1918, he was named office engineer at Cincinnati and was subsequently promoted to assistant engineer maintenance and construction of the Baltimore & Ohio Chicago Terminal at Chicago. In 1937 he joined the Alton (now the GM&O) as division engineer at Bloomington and in 1943 was named chief engineer of the Alton at Chicago. In 1947 he was named assistant chief engineer of the GM&O—the position he held at the time of his retirement.

M. D. Carothers
G M & O

Nelson Thompson
Homelite

Supply Trade News

AIR REDUCTION SALES CO.—H. C. Wallace, assistant regional sales manager, has been named regional sales manager of the Southern Region, succeeding **M. G. Wicker,** resigned. Mr. Wallace will maintain his office at Houston, Tex. **R. Pringle,** salesman, has been named assistant sales manager at Houston, succeeding **A. W. Gilpin,** who has been named assistant to the regional sales manager.

BUCYRUS-ERIE—Edwin T. Goree has been promoted to assistant general sales manager at South Milwaukee, Wis.

HOMELITE—Nelson Thompson, vice-presi-

SIMPLEX JACKS

First Choice for Railroad Use!

POLE PULLING AND STRAIGHTENING JACKS

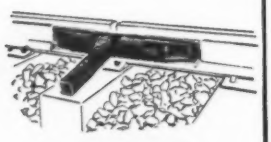
5 and 15 ton models for all pole sizes. Base pivots. Also can be used for guy wire tightening and pulling underground cables.

TRACK JACKS
(Trip Type)

Malleable or aluminum housings. Large grooved toe areas. Trip on both sides. 12 models.

HYDRAULIC JACKS

Capacities of 3-100 tons. 8 models. Also self-contained and remote controlled hydraulic rams and pullers.



RAIL EXPANDERS

Permit crossing and switch lining, rail spreading and pulling without service interruption.

OTHER SIMPLEX RAILROAD JACKS

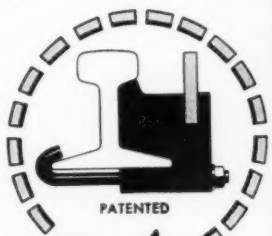
- Tie Removers and Replacers
- Tie Spacers
- Cable Reel Jacks
- Pipe Pushers
- Push-Pull Jacks
- Ratchet Lowering and Standard Speed Bridge Jacks
- Jack Supports
- *Write for Details in Railroad Bulletin*

TEMPLETON, KENLY & CO.
2543 Gardner Road
Broadview, Illinois

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX JACKS
RE-MO-TROL UTIL-A-TOOL JENNY ROL-TOE

For the Smoothest Paved Areas Over Railroad Tracks . . .



Use KASLE IMPROVED

"Guardmaster"

FLANGEWAY CROSSING GUARD

Smooth Durable Crossings—Low installation and Maintenance Cost.

Write today for Brochure.

TRACKWORK of ALL KINDS

Rails of all sizes, Splice Bars, Bolts, Spikes, Tie Plates, Frog and Switch Materials, Tools, etc. Railroad Track Material inquiries invited.

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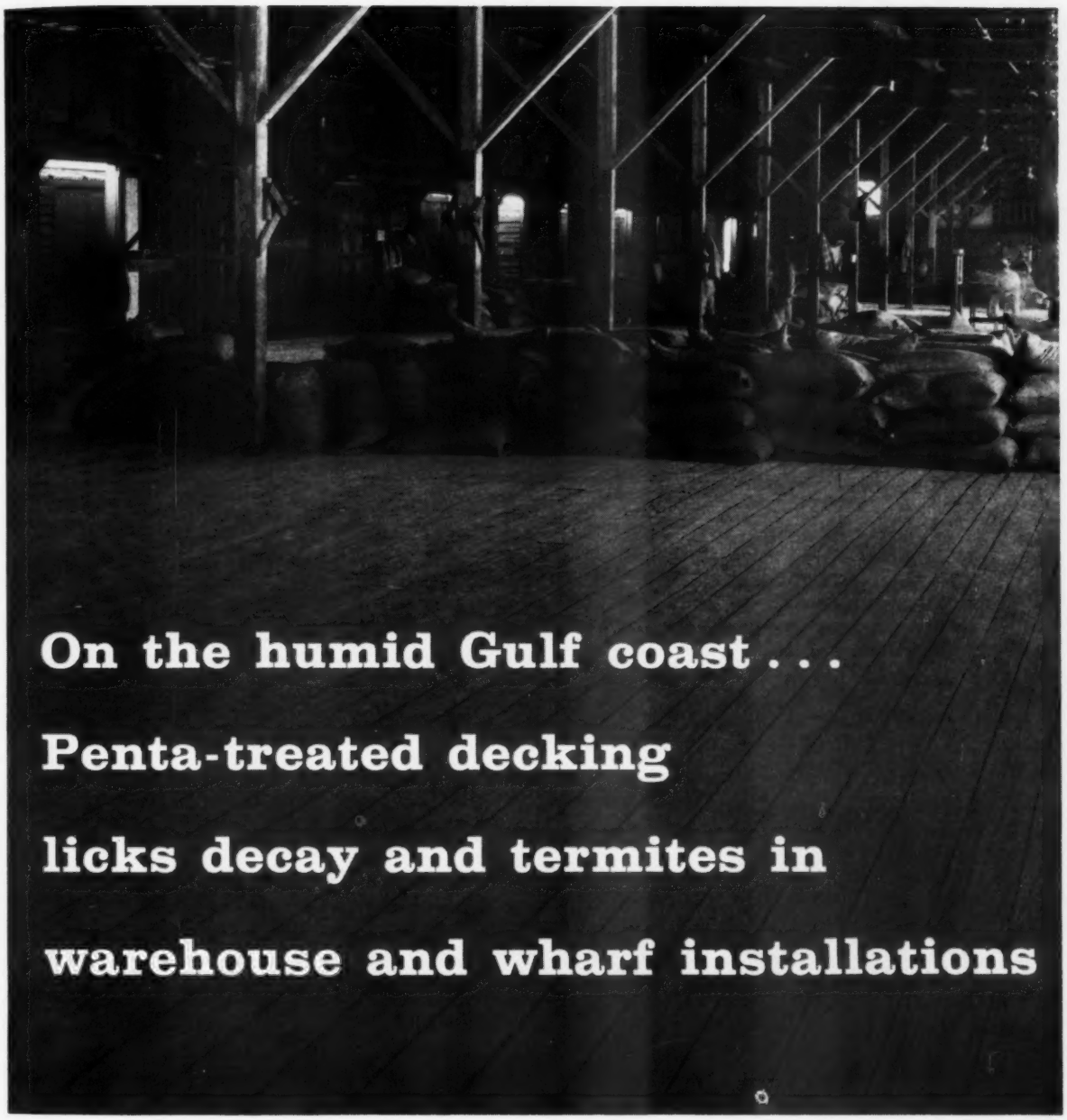

On the humid Gulf coast . . . Penta-treated decking licks decay and termites in warehouse and wharf installations

(photo, courtesy of Texas & New Orleans R. R.)

1955—184,012 board feet of clean Penta-treated decking installed in Gretna Wharves, Gretna, Louisiana.

1957—Report: "Penta-treated material gives lasting protection against decay and insect attack. The treatment is clean enough so as not to contaminate bagged goods such as raw sugar . . ."

Here's the severest test any treated wood will have to meet. In the warm, humid Gulf coast area, wood decay and termites thrive in abundance. But termite-proof, rot-resistant Penta-treated wood, that stays sound for 30 years or longer, is meeting this test head on . . . saving many hundreds of dollars in repairs, replacements and the expense of a more costly installation . . . same as it will for you.

Easier, faster handling because it's clean. Oil-borne, *not water soluble*, Penta solution doesn't bleed out of wood to irritate and slow down workmen, stain cargoes or leave wood vulnerable to attack.

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Dept. PI-19A, St. Louis 1, Missouri

MONSANTO ®

Where Creative Chemistry Works Wonders for You

Supply trade news (cont'd)

dent, sales, has been appointed to the newly-created position of executive vice-president.

FRANK G. HOUGH COMPANY — T. J. Schuetz has been appointed sales manager of a newly established section of the firm's sales department to handle sales of towing tractors. The company is a subsidiary of the International Harvester Company.

KLEMP METAL GRATING CORPORATION— Gerald T. Hughart, formerly associated with the Stearns-Rogers Manufacturing Co., Denver, has been appointed general manager of the corporation.

LETOURNEAU - WESTINGHOUSE — O. C. Zachary, service engineer, has been promoted to district sales representative in Virginia and the Carolinas, succeeding **D. H. Mitchell,** who was recently promoted to eastern sales manager.

MASSEY CONCRETE PRODUCTS—The American-Marietta Company has acquired the assets of this company and will operate it as a division of American-Marietta.

NELSON STUD WELDING DIVISION—The Mississippi Supply Company, 80 E. Jackson Blvd., Chicago, has been named a distributor for Remington powder-actuated stud drivers and studs, it was recently announced by Gregory Industries, Lorain, Ohio, national distributor.

U. S. BORAX & CHEMICAL CORP.—To meet the steadily increasing demands for borate products by the railroads and other industries, the firm has officially opened and dedicated a new open-pit mine and refinery in the Mojave Desert area of Southern California. Representing an investment of $28 million, the plant is expected to turn out approximately 70 per cent of the free world's total supply.

Obituary

William J. Pallowick, 65, railroad representative of the Chicago Pneumatic Tool Company, died recently.

Association News

Northwest Maintenance of Way Club

The program of the November meeting, to be held on the 21st, will consist of the showing of a film dealing with the development of Taconite and iron ore deposits, including those in Labrador. Commentary will be made by Professor Davis of the University of Minnesota, who has been doing special research work in this field. The meeting will be held, as usual, at the Midway Civic Club, 1931 University Avenue, St. Paul, Minn., with dinner starting at 6:30 p.m.

Mississippi Valley Maintenance of Way Club

The November meeting of the Club will feature an address by C. Miles Burpee, executive director of the American Wood Preservers' Institute, entitled "Pressure Treated Forest Products on Railroads." Mr. Burpee's address will be supplemented by color slides.

The meeting will be held, as usual, at the Hotel Coronado, St. Louis, November 11.

Maintenance of Way Club of Chicago

The November meeting of the club will be held on the 25th at the Hamilton Hotel and will feature an address by A. V. Johnston, chief engineer, Canadian National. Mr. Johnston will speak on new line construction in Canada and will furnish commentary for a film on the construction of the Lynn Lake line in northern Manitoba and the Kitimat line in British Columbia.

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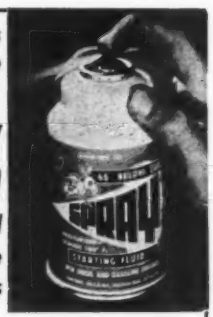

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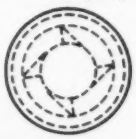

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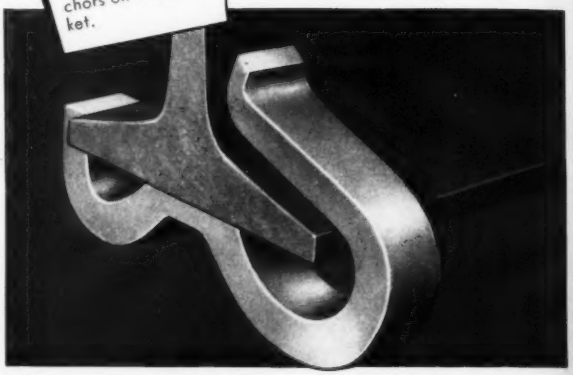

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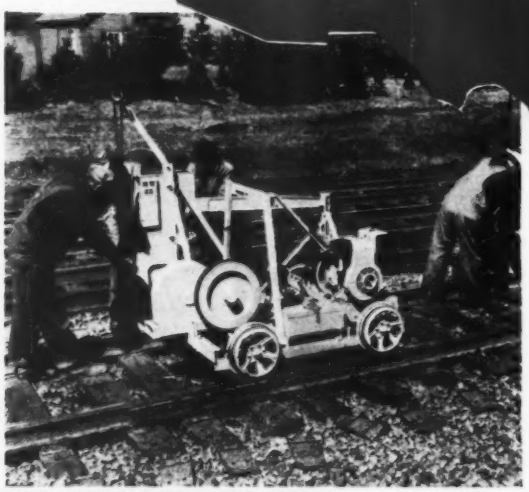

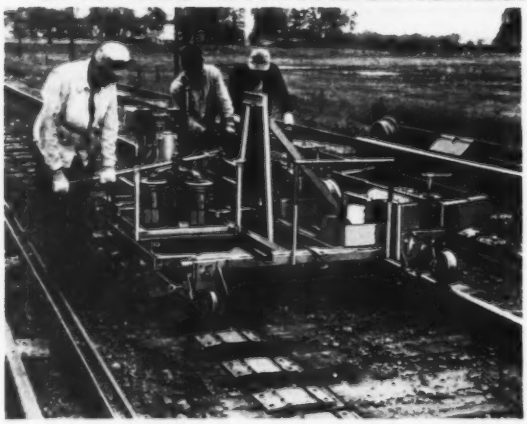

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